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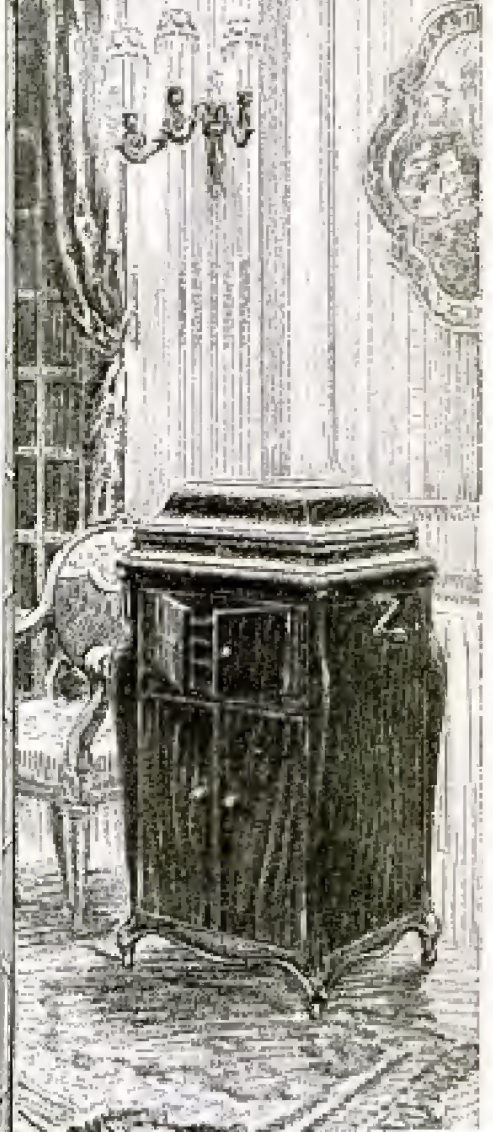
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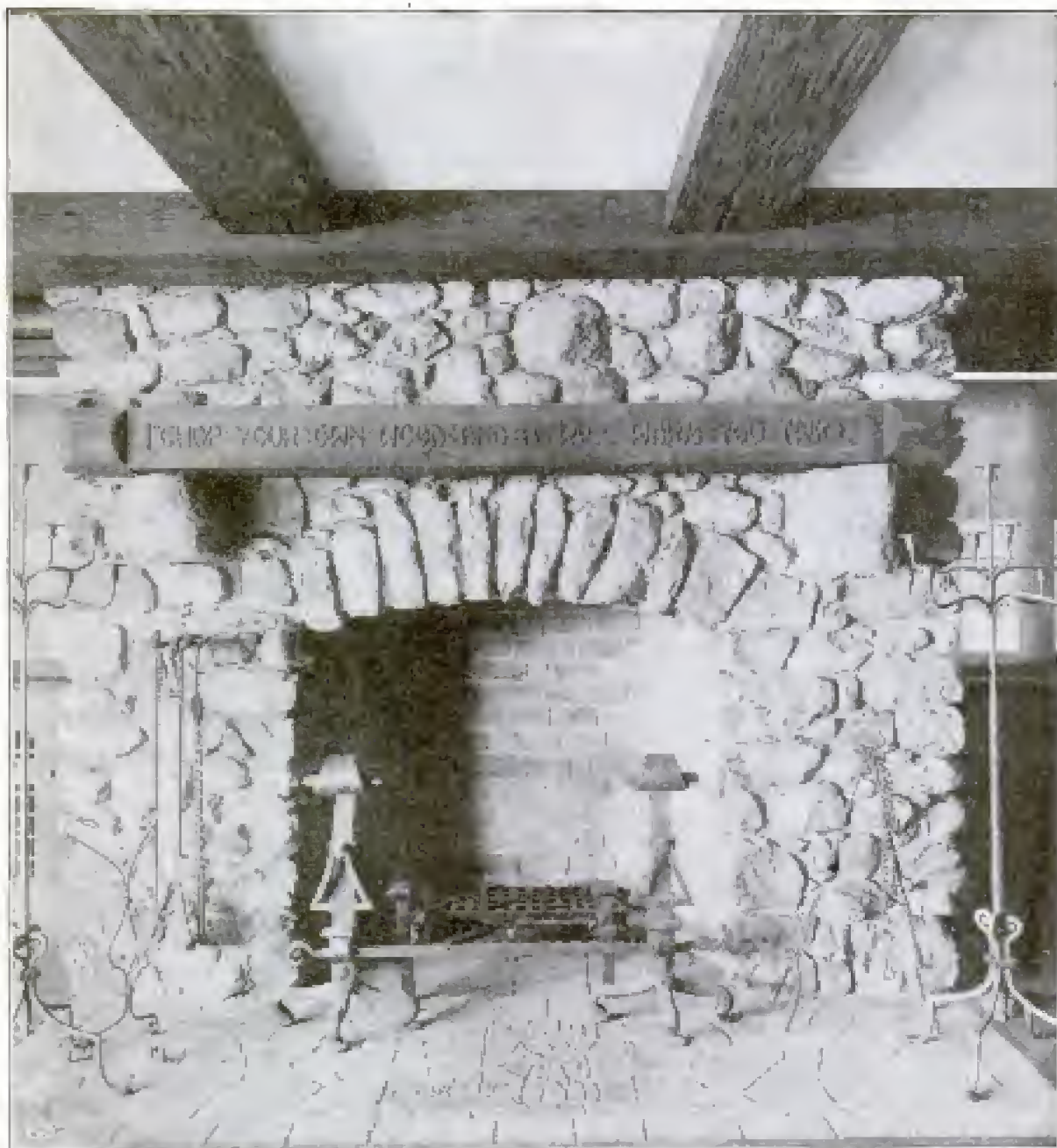
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# Popular Mechanics Magazine

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EDITED BY H. H. WINDSOR

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# WHAT DID THE CENSOR CUT?

## ANNOUNCEMENT OF PRIZE AWARDS

THE following awards have been made by the judges in the contest for the two best paragraphs to replace one cut by the censor from Lewis R. Freeman's article, "Bringing Down a Zeppelin," published in the December number of Popular Mechanics Magazine:

**FIRST PRIZE, \$200, Walter W. Baker, Portland, Oregon.**

**SECOND PRIZE, \$100, Charles C. Dunning, Pittsburgh, Pa.**

The winning paragraphs will be published in the March issue of the magazine.

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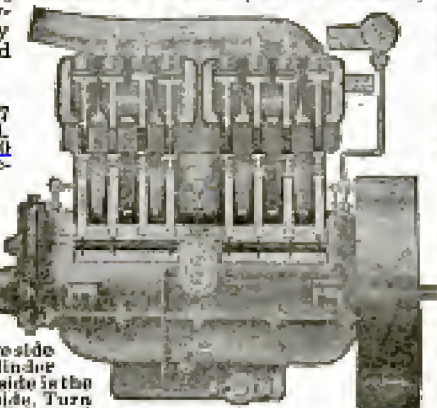
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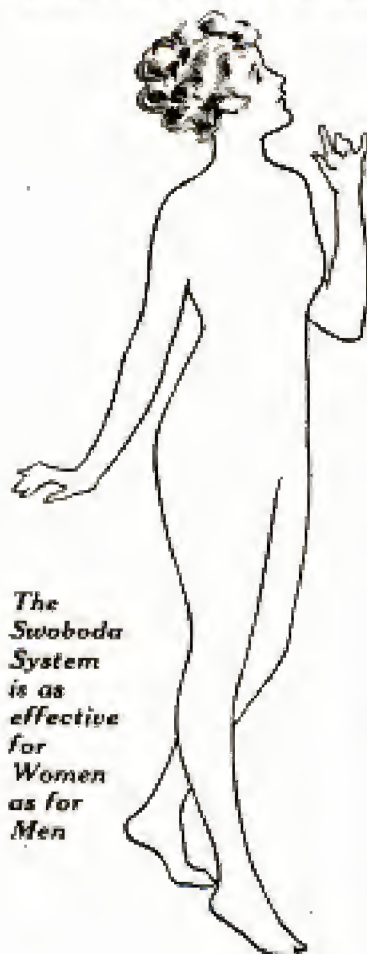


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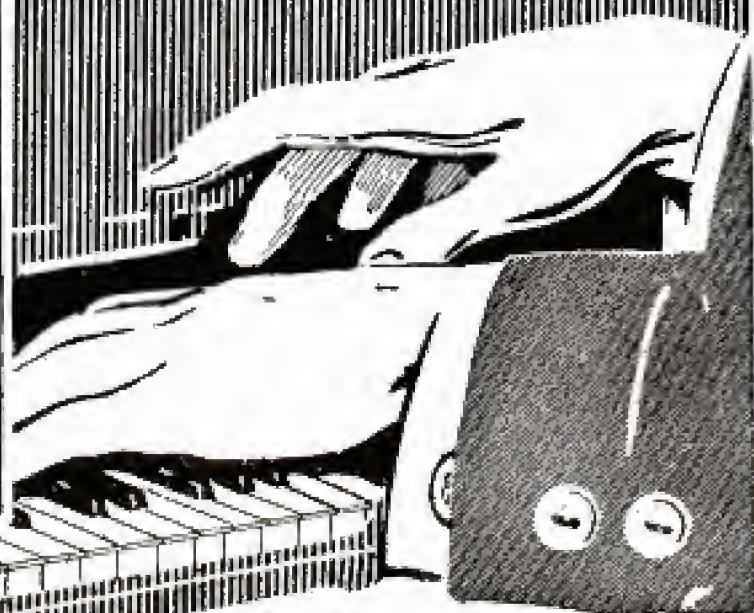
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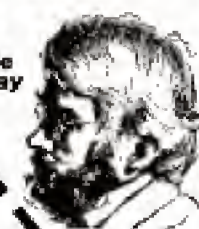
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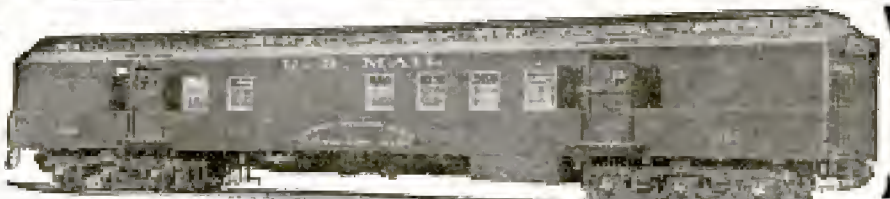
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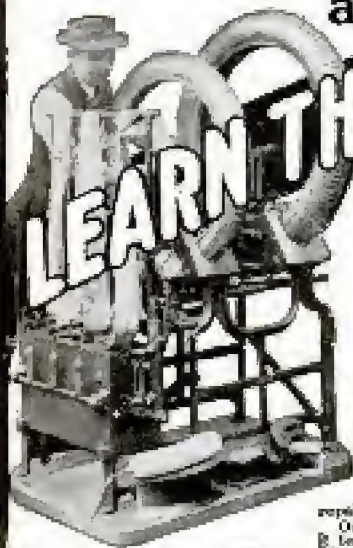
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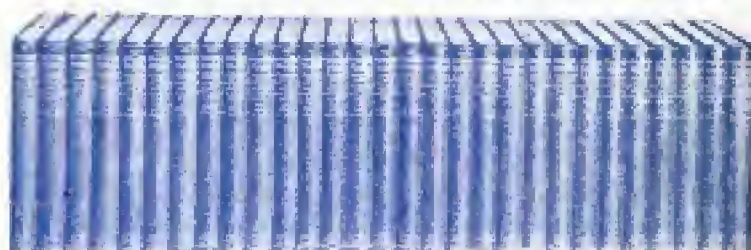
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**FOR** Sale—Late Model Edison Picture Machine complete for electricity or gas, also twenty reels film, \$150.00 for outfit. Doc Graham, Colonial Hotel, Birmingham, Ala.

**WRITE** for free catalog of best books on writing and selling photoplays, short stories, poems. Atlas Publishing Co., 304, Cincinnati.

**Big** Profit Nightly—Moving Picture Business—small capital starts you, easily accomplished. Teach you—furnish everything. Ralph J. Golsen, 5123 Kenmore Ave., Chicago, Dept. M.

**ARE** You a Movie Typist? Many of the greatest stars were discovered by accident. You want to know if you have the natural qualifications that bring \$50,000 salaries. The book Motion Picture Acting tells you this, also 194 screen fascicles show you how they register 495 human emotions. Use of cosmetics, costume requirements and color schemes also treated. Price leather \$1.10, cloth 75 cents postpaid. Popular Mechanics Book Dept., 6 N. Michigan Ave., Chicago.

**MOTION** Picture Operation, Stage Electric and Blinds—The only practical handbook and guide published for motion picture operators, theater electricians and managers. A thoroughly practical and useful book, covering the subject comprehensively. Pocket size, leather. 238 pages, fully illustrated. Price \$2.00 postpaid. Popular Mechanics Book Dept., 6 N. Michigan Ave., Chicago.

**LIGHTING** Arc and Battery Charging Generators sold on easy payments. Hobart, 180 34P, Troy, Ohio.

**MAKE** money writing Photo-plays; details free to beginners. No correspondence course. Producers League, 229 Wauwright, St. Louis.

## MAIL-ORDER SUPPLIES

**100% PROFIT**—Sample and plan, 10c. Howell, Box 24 M, Newton, Ill.

**ARP** Photos of moving-picture stars; latest novelty. 10 samples 10c. Ad. Smith, 2414 First Ave., Seattle.

**INCREASE** your sales. Place your products before the readers of "Cartoons Magazine." 20,000 copies guaranteed every month. Classified rate 5c per word. Mail in a trial ad today. Cartoons Classified Dept., 75 E. Madison St., Chicago.

**SELL** Joker's Novelties! 16 samples, 10c. Chambers Works, Plainwell, Mich.



## BUSINESS OPPORTUNITIES

**TRAILERS**—The solution of the delivery problem for farmers, merchants and every business man with delivery work. We want one or two good men in each state—preferably men with Ford cars—to handle the well-known, advertised Masco trailers. Can be attached to Ford or any other car. 15 to 15-ton capacity. Every community a fertile field. Exceptional opportunity for extract or similar men covering good territory. Plenty of sales and big returns on each one. Write quick. Michigan Auto Trailer Co., 226 Twenty-first St., Detroit, Michigan.

**INDEPENDENCE** and become quickly established in the Manufacturing Mail Order business. I furnish Formulas, Manufacturing Processes and Trade Secrets in all lines. Sold under positive guarantee; 18 years' practical experience. Revision and improvement of Formulas and Processes—reduction of manufacturing cost—utilization of waste materials, etc., a specialty. Booklet, Formula List, and Valuable Information Free. W. L. Cummings, Ph. D., 127 Highland St., Syracuse, N. Y.

**MANUFACTURERS, Promoters and Patent Buyers** are invited to write us stating the line of invention in which they are interested, as we can supply their wants in any class of patents. Victor J. Evans & Co., 142 Ninth St., Washington, D. C.

**WE Loan Money**—Making Books, Mail-Order Plans, Schemes, Instruction Courses and Formulas, selling from \$50 to \$15.00. Fee, 2c weekly. Library Catalog Free. Business Library, 441 East 10th, New York.

**LEARN** the real estate business. Our complete instruction book teaches: Rating, appraising, management, salesmanship, insurance, brokerage, advertising, renting, agency forms, etc. 121 subjects. Books \$20.00 correspondence course. Booklets free. \$1.00; silk cloth, \$1.25 postpaid. Catalogue free. Realty Book Company, Dept. 29, Cleveland, Ohio.

**NEW Way to Paint Signs**—Our patterns do the work. No experience required. Complete outfit, prepaid, \$5.00. Satisfaction Guaranteed. Dotts Advertising Co., 614 Gumbel Bldg., Kansas City, Mo.

**MONEY** made making and selling Hard Houses, Blue Prints for Making, 40c. C. S. Blue Print Co., 1209 Third Avenue, Detroit, Mich.

**AFTER** years of manufacturing, we now offer our Face Cream and Hand Lotion formulas to others who wish to make toilet goods, at home. Both formulas for 50 cents. Druggists Supply Co., 1601 Tazoma Ave., Cleveland, Ohio.

**PHOTOGRAPHS** in demand. Make extra money. We show you how. Details free. Rex Publishers, Box 175, B-12, Chicago.

**"HIRE Yourself as Boss."** Big corporation will back you in a money-making mail-order business selling guaranteed, quick sale goods. Start at home or at your office in spare time. Very small investment will prove the selling plan a winner. No stock to carry, as we will ship direct to your customers if you wish. Handle everything by mail; no interference with your regular work. Experience unnecessary. My valuable instructions telling you just what to do and how to do it are free. Write for instructive booklet, "Foreword Facts." It's free. Wm. J. Dick, Mgr., Dept. F-19, 26 W. Lake, Chicago, Ill.

**NEW Worm-Driven Rotary Disc Valve Gasoline Motor.** Seed capital to build sample motor—business manager to start corporation. Can be seen by appointment. Koster, 1131 Bedford Ave., Brooklyn, N. Y.

**CHEMICAL** analyses. Manufacturing problems solved. Research work. Submit your problem for free advice and estimate. Chemist, 30 Pontine Ave., Jamaica, New York.

**GOOD** monthly income easy in spare time manufacturing letters for signs. Free particulars. J. P. McPherson, 677 Brown Avenue, Butler, Penn.

**LARGE** hardware manufacturer desires to manufacture marketable articles, patented preferred. Must be meritorious and profitable. Not necessarily tools, yet must be confined to hardware line. State number and date of patent, cost and selling price, and give model or sketch. H. C., Room 666, 78 E. Madison St., Chicago.

**MAKE** and sell your own goods. I tell you how. 4 2c stamps for list. Duncan, Box 1655, Richmond, Va.

**WE** will start you in the cleaning and dyeing business. Little capital needed, big profits. Write for booklet. Ben-Vende System, Dept. C, Charlotte, N. C.

**WANTED**—Electrical, automobile or other clever specialties. Will buy business or goods outright. Immediate sale assured. International organization. S. C., Room 920, 6 N. Michigan Ave., Chicago.

**SPLENDID** Mail Order novelty for sale, just patented, including over \$100 worth Tools, Dies, etc. Great opportunity. M. W. Smith, 127 Smith Street, Millville, N. J.

**DOLLARS** yearly in your backyard. No glueing, mushroom dope. New ideas. Investigate. Particulars free. C. Metz, 312 East 89, New York.

**A NEW Money Maker.** Will some one take General Agency for this New article? Cost 10 cents, sells for one Dollar, 20,000 sold in Minnesota. Send 20 cents for Dollar sample. The Chemist Co., 2841 No. Thomas, Minneapolis, Minn.

**MANUFACTURE** Latest High-Grade Automobile Specialties from my Guaranteed Reliable Formulas, with full Manufacturing Information of every Automobile Specialty sold, including wonderful Carbo-Cide, Automobile Fuel, Talcot Form, Fibro-Vac, Efficient Automatic Puncture Plugger. Greatest Possibilities—200 to 500% profit. Miller, Manufacturers' Chemist, Tampa, Florida.

**YOUNG Men**—We build our big organization from rank. Lifetime business, big income before any live intelligent man in our company. We are establishing branches everywhere. We train you; start you right, \$1,500 to \$5,000 yearly, at home or elsewhere. No capital required, though possession of \$250 to \$500 gives better chance. Rogers, Thurman & Company, 35 East Madison St., Chicago.

**500 FORMULAS**, including Restoring Mirrors—Renewing Dry Batteries, Luminous Paint, etc. Ideal Book Shop, B-2 Irving Station, Chicago.

**PORT Sale, Cheap**—Large, wealthy territory, near New York City, for best known auto. Established repair and accessory business. Wonderful field for hunter. Personal reasons. Y. M., Room 319, 4 N. Michigan Ave., Chicago.

**IN your spare time** start a Collection Business. New System of collecting by mail. Wonderful results. Full details sent free on request. Capital Railing Association, Dept. P, 56 East Randolph Street, Chicago.

**PROFITABLE** in that if you think an advertised plan is impracticable or misrepresented, get mine and be undeceived! Business permanent and profitable. Easily worked during spare time; no canvassing. You can start with less than \$10. Plans with samples—25c. Circular free. Andrews, 2115 Cornelia, Chicago.

**PATENTABLE** Ideas Wanted—Send for 5 free books. R. B. Owen, 30 Owen Bldg., Washington, D. C.

**FLM** Company establishing agencies throughout the United States. Offers unusual opportunities. Hudson Film Company, 1547 Broadway, New York.

**ANYBODY** can earn \$1 daily, raising mushrooms in cellars, sheds, basins. Success guaranteed. Free Booklet, Huron Barton, 391 West 48th St., New York.

**LUMINOUS** Paint. Shows in the dark. Make and sell your own Luminous articles, watches, clocks, electric switch plates, crucifixes, etc. Visible at night. Only 25c sample bottle. Circular free. Luminous Paint Co., Dept. P, Douglas Park Sta., Chicago, Ill.

**NEW \$2.50 Automatic Adder**, sells quick from demonstration. Big profits, no competition. Every business man buys. Bassett, 3021-C Indiana Ave., Chicago.

**START** in carpet or clothes cleaning business. We show you how. Only \$175.00 capital needed to earn good income. Thurman Vacuum Cleaner Co., Manufacturers all types cleaners, Dept. H, St. Louis.

**INVENT** Something. It may bring wealth. Free book tells what to invent and how to obtain a patent through our Credit System. Waters & Co., Succeeded by Talbot & Parker, 4102 Warner Bldg., Washington, D. C.

**GOOD** money easily earned at home, sparetime, silvering mirrors; No capital. Free instructive book tells how. Patterson & Co., Brookville, Ky.

**SPARETIME** Money-makers. Unlimited possibilities. Little capital required. Complete set of formulas 10c. Particulars free. Chester Zell, Springfield, O.

**BECOME** a Playground Instructor. We train you by mail; small charge; thousands of positions; good salary; particulars free. National Playground Institute, 747 S. 19th, Newark, N. J.

**"BOOSTER"** may contain the money-making plans, formulas, ideas, suggestions and inspiration you need. Published since 1899. Send 10c for copy and make more money. Booster Magazine, Northwestern Bldg., Chicago.

**HUGE** Opportunity to make money, new simple ways. Blue Ribbon Scheme Book, Particulars free. Eberhart Company, 417 E. 151st St., New York.

**Third New Mail Order Poultry Business** extra Big Profits on Little Capital. Write National Poultrymen's League, 2121 Times Bldg., Chicago.

**OUR** advertisement under Agents Wanted will interest you. Head it, Marshall Robinson & Co.

**\$500 To \$5,000 a year**; splendid spare-time business; little capital required; full particulars—direct. C. Gilmore, Santa Barbara, Calif.

**YOUR** own boss this year. General agent to appoint sub-agents. New office specialty, 150% profit, \$5,000 to \$10,000 yearly. Small investment required. Write quick. Sales Manager, Tomahawk, Wis.

**ENTER** a new business. Earn \$3,000 to \$6,000 yearly in professional free making and fitting a foot specially, openings everywhere, with all the trade you can attend to; easily learned by agents at home in a few weeks, at small expense; no further capital required, no goods to buy, job hunting, soliciting or agency. Address Stephenson Laboratory, 11 Back Bay, Boston, Mass.

**CONDUCT** a profitable Candy Kitchen; very small capital required; booklet free. Kennon School, 509 Wells St., Dept. A, Chicago.

**LEARN** the "Practical" Advertising Business and become independent. I teach you how to establish yourself without capital, and furnish you original plans and methods to work upon; rare opportunities; booklet free. Dawson, Avenue 3, Stockton, California.

**BIG** money in promoting inventions. Write Adam Fisher Mfg. Co., 2610D Railway Exchange, St. Louis, Mo.

**MAIL** Order Dealers. Let the 4 in 1 coupon plan increase your profits. Sell valuable instruction systems by cut price coupon under money back guarantee. Big margin. Small selling expense. Complete plan, sample coupons and bargain bulletin sent on request. Mail Dealers' Coupon System, 519 So. Dearborn St., Chicago.

**EARN** good money at home silvering French mirrors; no capital. Free instructive booklet. D. Malin, 284 Pacific, Brooklyn, N. Y.

**INCORPORATE**—Congress laws for D. C. and all States; cheap, raise money easily, advice free. Collections and legal matters everywhere. All courts and Government Departments. U. S. Legal Corporation, Washington, D. C. Representing \$1,225,000.00.

**ADVERTISERS, Mail Dealers.** Our New Rate Book lists 2,900 Principal Publications, rates, circulation. Includes 50 Mail-Order Plans. Free. Dearborn Advertising Agency, 210 Franklin Bldg., Chicago.

**INVENTORS:** We develop and perfect inventions, make models, dies, tools. Metal stamping and special manufacturing. Gering Bros., 1208 Bldg., Cincinnati, O.

**WE** start you in business furnishing everything; men and women make handsome income weekly operating our "New System Specialty Candy Factories" home or small room anywhere; no canvassing. Opportunity lifetime; booklet free. W. Rensdale Co., East Orange, N. J.

**LEARN** to collect money. Good income; quick results. Send for free booklet, "Skillful Collecting." Collectors' Association, Long Street, Newark, Ohio.

**START** Profitable Mail Order Book Publishing Business. Original, exclusive, dignified; big money, small capital. Easily operated. Unlimited possibilities. Efficiency Library, 178, New York, N. J.

**MAIL** Order Business is your opportunity. Start as side line, the Breaker way, gradually earn good income. Business like dentistry, common sense, honest help, exclusive plan to every client; proved successes. Send 25c for information worth a dollar; no free circulars. Breaker, 505 A, Walnut, Philadelphia.

**DURING** 1916 I made good income in my sparetime evenings, writing articles for trade papers. Good opportunity for anyone. No experience necessary. Particulars and list for 3 red stamps, Box 296, Ft. Collins, Colo.

**"FLASHY"** New Invention for Everybody. See our advertisement, Page 168.



**CHEMICAL** Analysis taught in few lessons by mail. Practical, specific, clear cut instructions written in simple language which you understand. No hair-splitting theories. No previous knowledge required. Excellent opportunities. Durant Laboratories, Berkeley, Cal.

#### TO MANUFACTURERS

**WANTED** Party to manufacture the only Sanitary Cuspidor made, which does away with the old system of cleaning by using Paper Fillers in a wire frame. A Fortune in this for the One Who Acts. Best & Clemens, Box 867 Walla Walla, Wash.

**WANTED** contract or royalty manufacturers who can do drop-forging and machine work on pillars or pinchers. "Talented back." Address J. W. Ferguson, Jacobs Creek, Pa.

**WANTED**—I want a good mail-order article. H. J. Bihler, Florence, Kansas.

**WE** are expert and successful distributors, with representatives in the principal cities of the country. You as a producer need our service. We can sell more of your goods at a greatly reduced cost. Nothing too large or too small to receive careful consideration. No charges for full information. International Service Corporation, 281 West Lake St., Chicago.

#### FOR ADVERTISERS

**INCREASE** your business. Advertise in 24 Metropolitan Newspapers. Cost \$10. Circulation nearly 3,000,000. Results big. Write for booklet "It," also our suggestions and analysis. How to Increase Your Business. Giesher-Bradford & Co., 1931, 1825, Advertising Agents, 44 W. Randolph St., Chicago.

**30 WORDS** in 100 monthlies \$1; 100 weekly \$2; 30 Sunday papers \$3; all \$12. Cope Agency, St. Louis.

**YOUR** ten-word ad. in our 9x12 magazine, reaching 50,000 boys, for 5c. Extra words, 5c. Country Boy Magazine, 2875 Matters Bldg., Chicago.

**IT'S** Different—in our word. United Post Card Magazine, Phila.

**20-WORD** advertisement in 120 monthly magazines for \$1. Continental Exchange, Hollywood, Calif.

**20-WORD** Ad. in over 100 monthlies, \$1.40. National Opportunity, Scranton, Wis.

**ADVERTISING** Penella Stamp brings sample. Graybill & Co., Lancaster, Pa.

**"TWENTY"** words in ten big Sunday papers, \$2.75 extra words, 10c. Other savings. Best rates—lowest rates. Stanford Agency, Canonsburg, Pa.

**ADVERTISERS**—Here's your opportunity. Your proposition placed before the readers of "Cartoons Magazine" for only 5c per word. Circulation 20,000 copies guaranteed. Send a trial ad for our next issue. Cartoons Classified Dept., 6 N. Michigan Ave., Chicago, Ill.

**YOUR** Thirty-Word Ad. in our big post-card magazine, 25c. Rich display, 30c. Elite Exchange, 3694 Milwaukee Ave., Chicago.

#### ART AND ADVERTISING SERVICE

**A FORCEFUL**, result-getting advertising service; sales letters, folders, booklets; mail-order campaigns. What are your needs? Satisfaction guaranteed. Harry Stern, 1606 Gaylord, Denver. (Tenth year.)

**ADVERTISING**—Copy Prepared—Expert Service. Brewster Business Builder, 45 B Street N. W., Dept. 25, Washington, D. C.

#### BUSINESS SERVICE

**TRANSLATING** from and into foreign languages. Homedes, 811 Corinthian Ave., Philadelphia.

**INCORPORATE**. Our lawyers do the work, saving you time, money and money in incorporating under the most liberal laws of Arizona. Laws and forms free. Southwestern Securities & Investment Co., Box 10488, Phoenix, Ariz.

#### BUSINESS FOR SALE

**FOUR** Sale at Low Figure—Old established and paying, new and second-hand Machinery and Rental Business. (Incorporated.) Fine location. Plenty of business, can be greatly extended if desired. Present owner's time needed elsewhere. Present value about \$26,000. Address Box 196, Joplin, Mo.

#### AGENTS WANTED

**TAILORING** Agents Wanted—Big complete sample outfit and case, nearly 300 large cloth samples, 3 piece lists and everything needed for canvassing or use in store, free to live agents. \$25.00 to \$50.00 a week; may make more. Write us today for free elegant outfit to begin, cloth samples, wholesale prices, special offer on a suit for yourself and full information—see our wonderful values, beautiful fabrics and styles. Established 28 years. Every garment made to measure—everything guaranteed and express prepaid. Just send a postal. American Wooden Mills Co., Dept. 214, Chicago.

**INSIDE** Tyres, inner armor for Automobile tires, double mileage and prevent punctures and blowouts. Quickly applied. Cost little. Demand tremendous. Profits unlimited. Details free. American Automobile Accessories Co., Dept. P, Cincinnati, O.

**AGENTS**—Managers! Stop here! Sell the Perrin No-Glare for Auto Headlights. Takes out the "glare" without reducing driving light. Used on every machine. Low in price—sells like lightning. Makes night driving safe and easy. Passed and recommended by city and state police everywhere. Only practical auto-glass device. Put on without tools—never wears out. 300,000 in use. Lister: Davis, Texas, cleared \$81 one week. Wallace, Michigan, made \$14 first day. Big quick profits and we guarantee sales. Write today for information. Perrin Mfg. Co., 473 Woodward Ave., Detroit, Michigan.

**100% PROFITS** easily made taking orders for our new patented Vacuum Sweeper. No traveling; experience unnecessary. Valley made \$150 last week. Write quick. United Vacuum Sweeper Co., 1315 West Congress, Chicago.

**MECHANICS**—300% profits. Make up your own goods and be independent. Catalogue free. Remag Co., 1205 Randolph St., Chicago.

**AGENTS**—Our gold window letter proposition beats 'em all. Stahlbake Co., Dept. P, 1115 Second Ave., N. Y. Established 1905.

**STOP** Here! Just out—Elsen Regulator for Ford Headlights. Selling like wild fire everywhere. Gives splendid driving light at low speed—keeps bulbs from burning out—works entirely automatically. Needed on every Ford. Big profits quick. Lister: Hopkins, Tenn., cleared \$16.20 first day; White, Michigan, \$134.00 one week. No experience or capital needed. We show you how; sales guaranteed. Hurry—don't delay. Write now for special information. Address Elsen Instrument Co., 354 Valentine Bldg., Toledo, Ohio.

**GOOD** Income refashioning chemists, dress beds, automobiles, etc. By new method, producing amazing results. No capital or experience necessary. Particulars free. Commercial Co., Ave. G, Decatur, Ill.

**AGENTS** Wanted: Sell Polishing Cloth. Best Remover, Ford Flare, etc. 130 household necessities, guaranteed line, big profits, quick repeater, permanent business. Stuart & Co., 16 Main St., Newark, N. Y.

**AGENTS** make \$100 monthly selling our 500 handy household articles. Catalogue free. Scheff Company, Des Moines, Ill.

**AGENTS**, sell reliable custom-made raincoats. Big commission. Complete sample line free. Temple Raincoat Co., Box 62, Tremont, Mass.

**"1910'S SENSATION"** Eleven piece toilet article set selling like blazes at \$1.50 with \$1.00 carrying set free! Enormous profits! Tremendous hit! Eagle made \$51.00 first week. Write quick! Pierce Co., Dept. P, 206 Lake St., Chicago.

**SOMETHING** new and different: Shure Shine for Automobiles, Furniture, etc. Fast seller. Enormous field. Exclusive territory to holders. For particulars and sample write Daydark Co., Desk 84, St. Louis, Mo.

**WANTED**—New Ideas. Write for list of Patent Buyers and Inventors Wanted. \$1,000,000 in prizes offered for inventions. Our Four Books sent free upon request. Victor J. Evans & Co., 105 Ninth, Washington, D. C.

**LARGE** Manufacturer wants representatives to sell shoes, underwear, hosiery, dresses, waists, skirts, direct to homes. Write for free samples. Madison Mills, 586 Broadway, New York City.

**AGENTS**, Either Sex, the greatest 25c proposition on earth. Send six two-cent stamps for sample, particulars. Ideal Specialty Co., Duluth, Minn.

**TAKE** orders for men's custom tailoring, part time or all time. We furnish samples and everything needed to make a success without experience. Low prices; fit guaranteed or money refunded. You make good money on every order. You can wear swell clothes for almost nothing. Write quick for samples and all information if you live in a town smaller than 5000 or on R. F. D. Knickerbocker Tailoring Co., Dept. 549, Chicago.

**AGENTS**—"Exclusive features" are what make easy sales—I can gain attention, close the sale and collect the money on six customers with the exclusive features of my non-messy-the harvesting attracts, while you are struggling with one customer on the old commonplace line of talk. So can you! Prove it! Write today—big summer sellers—extra summer profit. J. M. Picken Co., 420 R. St., Newark, New York.

**AGENTS**: Biggest money-maker. "Traveler Support"—new invention. Guaranteed to please. M. & M. Mfg. Co., Cincinnati, Ohio.

**LARGE** Manufacturer wants agents to sell made-to-measure raincoats direct to customers; cheapest prices; outfit free. Standard Raincoat Co., 305 Broadway, New York.

**AGENTS**—Men and women. Make \$30 to \$50 weekly selling the New Improved Mont of Self-Heating Iron—the "World's Best." Over \$50,000 in use. Positively the easiest, fastest selling, lowest priced, best known iron made. Binding guarantee. Big profit for all or part time. Evans, N. Cal., sold two dozen on Saturday. Mrs. Nixon, Va., sold eight first half day. Liberal terms. Exclusive territory. Sample outfit free to workers. Write today. The Montmor Red Iron Co., 826 Wayne St., Big Prairie, Ohio.

**AGENTS** to travel by automobile to introduce our 250 fast-selling, popular-priced household necessities. The greatest line on earth. Make \$50 a day. Complete outfit and automobile furnished to workers. Write today for exclusive territory. American Products Co., 5830 3rd St., Cincinnati, O.

**WANTED**—Agents—men or women in every town to sell high-grade Phonographs. Direct from factory; earn \$50 to \$200 per week. Northwestern Phonograph Works, 111 E. 4th St., Chicago.

**WOMEN**, Earn \$10.00 day taking orders for large, warm, heavy blankets, 50x70, at \$2.25 pair; your profit \$1.00 pair; gray, tan, white; beautiful colored borders; everybody needs blankets; biggest seller out; send \$2.25 for sample, sell shop friends and others; money refunded if not pleased. National Supply Company, Box 792, Richmond, Va.

**AGENTS**—\$42.00 weekly selling guaranteed article housewives cannot resist. C. E. Moore, Bedford, Pa.

**AGENTS**, if \$1 an hour looks good, write N. I. Mfg. Co., St. Louis, Mo.

**ARE** you tired of inside work? We need a man in your vicinity, permanently. Commission paid weekly. No delivering or collecting. "Lads" furnished. Write today. Dept. P, Brown Brothers Nurseries, Rochester, N. Y.

**SELL** first-class household necessities. Mohawk Specialty Co., Whitesboro St., Utica, N. Y.

**AGENTS**: Cooper made \$331 last month; \$91 last week, selling "Kankash" Raincoats. New proposition. We deliver and collect. Sample cost free to workers. Cumer Mfg. Co., 26 Paige St., Dayton, Ohio.

**AGENTS**, Either Sex: Sell our New Lucrative Cross Picture. Whole or part time. Cross shines brilliantly in dark. Mysterious and impressive. Big profits. Sample prepaid 25c. Particulars free. Hyde Art Co., 425 N. Ashland, Chicago.

**AGENTS**—Send for sample "Fretnot"—the wash day wonder. Be convinced you can do a whitewash business. You can clear at least \$20 to \$100 weekly, according to spare or whole time. You don't have to talk; if she doesn't buy at sight, leave sample; she will be looking for you long before you are able to make the round again. Samples furnished free. Premiums for your customers. Exclusive territory granted to agents who can produce. Credit given. Don't call, P. M. Motter & Sons, 513 Warren Ave., Chicago.

**WE** Pay \$80 Monthly Salary to those who qualify and furnish rig and expenses to introduce guaranteed poultry and stock products. Higler Company, X343, Springfield, Ill.



**AUTO Owners**—We want a few live motorists who drive their own cars to introduce International Half-Sole Tires in their territory. Greatest Tire Cost reducer ever offered to the motoring public. Practically sold on sight. Our sales jumped 400% in ninety days. For details write the International Rubber Company, 21 W. Tennessee, Denver, Colo.

**LARGE Manufacturer** wants Agents to earn good pay selling high-grade custom-made raincoats. Goods sell themselves. No experience nor capital necessary. Deliver to customer. Prices defy competition. Guarantee every sale. 1917 Quind free. Amer-Euro, Raincoat Co., 175 E. Broadway, N. Y., Desk P.

**AGENTS** can make big money selling hoodies of exceptional quality at prices that cannot be secured elsewhere. Big repeater. Write Fisher Hosiery Co., 123 Sterling Place, Brooklyn, N. Y.

**MAIL Order Fruits**—A 36-page exposition of the business, sent free. It's an Eye-opener! Address: Mail Order Corporation, Newburgh, N. Y.

**TAILORING Agents**—Get our Spring and Summer Samples. Men's suits to order. Greatest line retailing at \$15.00. Only big producers wanted. Leeds Woollen Mills, Chicago, Ill.

**CAR Owner Agents Wanted**. Write for details about the Funnel-Vac Gas Saver and Carbon Eliminator. Get going before the Spring rush season. Big repeater. The Funnel-Vac Mfg. Co., Box 451, Denver, Colo.

**AGENTS**—100 to 300% profit selling Duo Toilet Articles, Perfumes, Soaps, Soaps, Family Medicines and Specialties. Big every-day sellers. Exclusive territory. Quind free. All or spare time. Big chance. Full instructions. Write quick. Duo Products, Dept. C, 33, North Java, N. Y.

**200% PROFIT** selling Jubilee Spark Installations to automobile owners, garages. Sure cure for Spark Plug troubles. Sells like wildfire. Brand new. Exclusive territory. Write today. Jubilee Mfg. Co., Dept. M-3, Omaha, Nebraska.

**BIG Money Easy Selling** Uni-Lite. Agents can make \$50 to \$100 weekly in spare time. Equals 20 ordinary lamps or lanterns—200 candlepower. Used in house and outdoors. Get new free Uni-Lite offer. Acorn Brass Mfg. Co., 1153 Uni-Lite Building, Chicago.

**AGENTS**—\$5 daily selling our Handy Tool, 12 articles in one, lightning seller. Sample free. Thomas Mfg. Company, 742 North St., Dayton, Ohio.

**AGENTS**—200% profit. Wonderful little article. Sells like wildfire. Can be carried in pocket. Write at once for free sample. H. Mathews, 452 North St., Dayton, Ohio.

**PHOTO Pillow Tops, Portraits, Frames, Sheet Pictures, Photo Plates, Postcards, Spectacles** credited. Prompt shipments; sample and catalogue free to agents; 30-days' credit. Jas. C. Bailey Co., Desk C, Chicago.

**AGENTS**—With selling experience to sell direct to consumer made-to-measure suits, \$12.50 and \$18.50; if you want independent business with big money, answer at once before territory is taken; outfits furnished free. Midland Tailoring Co., Dept. E-9, 19 S. 5th Ave., Chicago.

**BIG Textile Mills** want ambitious men and women everywhere to show latest dress fabrics, neckwear, hosiery, underwear, and sweaters. 400 styles. Easy sales. Values beat stores. Money making over \$10 weekly. All or spare time. Complete sample outfit starts you. Standard Mills, 30 Benson St., Cohoes, N. Y.

**A MARVELLOUS Selling Article** Used in every home. Silvers, the polish that actually rubs on Sterling Silver, big profits. New selling plan. A good article to handle. Send 25c for sample outfit. F. Silvers, 151 Cedar, New York.

**AGENTS** make 500% profit handling Auto Monograms and Initials, Changeable Signs, Novelty Signs, and Window Letters. Catalog free. Hinton Co., 6142 14th Court, Chicago, Ill.

**WANTED**—Agents to sell our choice printed stationery. Visiting and address cards and commercial work. Send for outfit. Foreman Printery, Box 605P, Waterbury, Conn.

**COAL** is high—Our self making gas burner placed in cook stoves makes better, steadier heat and is cheaper. Agents coin money. U. S. Mfg. Co., Dept. P, Columbus, Ohio.

**CAN** you demonstrate the use of a merchant's commercial slide rule? Big commission. Richardson, 4202 24th Place, Chicago.

**AGENTS**. Get in touch with proposition paying \$5.00 daily. Experience unnecessary. People's Supply Co., Dept. "M," Lock Box 409, Pittsburgh, Pa.

**LADY** or gentleman in each town to represent reliable concern; permanent; no capital needed. Behmer Sutter, 713 Rush St., Chicago.

**GASTINE** eliminates carbon, purifies gasoline, gives 30% more mileage. In tablet form. Use one tablet in each gallon of gasoline. 100 tablets \$1.00. Good agents wanted. Liberal commission. Gastine Company, Bridgeport, N. J.

**DEMONSTRATE** Demarc Gas Saver to auto owners. Big seller. Big profits. Results guaranteed. Refund to agents for price of Demonstrator. Write quick. Demarc Mfg. Co., Box 355, Decatur, Ill.

**AGENTS**—Self-threading needles; sell at sight; package and terms inc. Clarence Mangum, Anderson, Ind.

**SELL** every woman's friend. "Handy" dish washer. Attaches to water faucet. 100% profit. Other specialties. Write Pangburn Specialty Co., Box 143, Dept. P, Scranton, Pa.

**SELLING** one dozen Cake Mixers per day; means \$1.50 daily. Sample and territory \$1.00, prepaid. Beck & Company, Sullivan, Wis.

**EVERYBODY** Needs Rubber Stamps. Make them yourself. Big profits. Quick, easy, simple process. Circulate free. Central Stamp Works, Newcastle, Indiana.

**AGENTS** wanted to sell "Air-Cure" self-rejuvenating patch for auto tires. Wild Mfg. Co., 1367 Mendota, Minneapolis, Minn.

**AGENTS**—Here's the best line of food flavors, perfumes, soaps, toilet preparations, etc., ever offered. Complete outfits furnished free to workers. Write today for full particulars. E. M. Feltman, Sales Mgr., 2322 3rd St., Cincinnati, O.

**AGENTS** to sell Photo Pillow Tops, Postcards, Crucifixes and all Luminous Goods. Photo Pillow Top Co., 2181 Gladys Ave., Chicago.

**SELL** like hot cakes, brand new treaded wax, perfumes, clothes; change to lining board; has asbestos iron roof. Working outfit 5c. Warrand, Lombard, N. Y.

**AGENTS** make 500 per cent profit selling our Auto Monograms and Initials, Window Sign Letters, Changeable Signs, and Show Cards. 1,000 Varieties. Enormous Demand. Sullivan Co., 1121 Van Buren St., Chicago, Ill.

**AGENTS**: You can make big money taking orders for our fine made-to-measure clothes, so write quick for 60 beautiful cloth samples. 72 smart styles in rich colors, wholesale and retail price lists, lowest prices and best offer to agents, \$5.00 to \$10.00 a day easy. Big outfit, over 250 samples free to live wires. No experience needed—no capital. We furnish everything free—our postage or express charges—back you, boost you, show you how and clearly explain everything. Costs nothing to try. Let us make you a stylish suit to measure to prove our fine quality and style. Send postal or letter today. Parsons Tailoring Co., Dept. 211, Chicago.

**AGENTS**—Sign painters, answer: "Ch-max," medium; new invention; transfers colors to glass; marvellous results; enormous profits; free samples. Wadhams, 20 Broadway, Brooklyn.

**A GOLD** mine for hustlers, nine months of the year. Food product of highest quality which saves one half the cost to householder. Sales made by sampling. Very little talk required. Men wanted to handle counties. Small capital needed. Write for particulars. Stephens Manufacturing Company, A. Bath, N. Y.

**HE** who has a prosperous 1917 is the Davis agent. Join the Happy Throng. Postal puts you cost our Business Building Plans. E. M. Davis Co., 505 Davis Bldg., Chicago.

**SIDE** line goods to carry in foot pocket. Sell per spot cash, make 100% guaranteed. Harlick Co., Kalamazoo, Mich.

**HE** lucky, Sell Marvel Shaving Soap. Lather. Shave without razor or brush. Samples 25 cents. Sell Marvel Rat and Mouse Exterminator. Marvel Mfg. Co., Springfield, Ill.

**AGENTS**, Salesmen, make \$35 to \$45 per week writing orders for guaranteed made to measure raincoats; new proposition; we deliver and collect; new 1917 swatches free. Belingard Co., 235 Main St., Findlay, Ohio.

**UNNEEDM** Expanding Cuff Buttons. Press slip over cuffs up forearm without unbuttoning same. Cuffs positively stay placed. Lowered they close automatically. Great laundry saver. Indispensable for all latest styles of shirts. A guaranteed necessity that appeals to all. Worn and approved by over 50,000 satisfied users. A sensational seller. Large profits and fine mail seller. Clean, high grade proposition. Also 25 other high grade agents' specialties. Flors Manufacturing Corporation, Sheboygan, Wis.

**AGENTS**: Money talks—how much are you making? If less than \$208 a month you will positively be delighted with our Sentinel Burglar Alarm proposition. Many agents easily earn \$15.00 daily. Brand new invention. Sells quickly on sight to homes, offices. Patented. No competition. Free exclusive territory. Instantly attached any door knob. Impossible turn knob without ringing bell. No batteries, screws, nails. Handsomely nickel-plated. Metals \$1.40. Provides cheap burglar insurance. It's a big money maker. Let us prove why. Write today for liberal terms to agents. Marshall Holdings & Co., Manufacturers, 1122 Marquette Bldg., Chicago.

**\$3.000 TRAVEL**, Accident Policy costs \$3 yearly. Weekly benefits \$15 for 26 weeks. Every person who rides in street, elevated, subway or railroad cars, steamboats or ferries should have one of our policies. Issued to men and women, ages 16 to 74. Big commission. Representatives wanted in Pennsylvania, New Jersey, New York, Illinois, Maryland, District Columbia, Rhode Island, Massachusetts, Delaware, West Virginia. \$250,000 State Deposit. Fred J. Schaefer & Company, 1123 Broadway, New York.

**QUICKEST** selling, easiest demonstrated auto-accessory: "Clear-Glass" (guaranteed bromer-back chemical product, in tin tube like shaving soap, smeared on windshield sheds Rain, Fog, Snow, Frost; one application restores clear vision 24 to 48 hours any weather; prevents accidents; sells 50c every Auto-owner, Motorman, Engineer. Circular free; sample, 5c. Agents everywhere 100% profit. Wilder Co., 31 Second St., San Francisco.

**AGENTS**—Sell Eg-Save; biggest repeater on market; 25c box takes the place of three dozen eggs; unlimited possibilities. Sterns made 90c an hour; Bush sold 12 dozen in less than three days; every housewife a prospective customer; guaranteed under pure food law; write quick. Eg-Save Co., Department P, 130 Oak Street, Buffalo, N. Y.

**MANUFACTURE** and Sell Zeeco-salt—New Guaranteed Egg Preservative (powdered), Heat Cold Storage, Wizard Washing Tablets, No Wax, Lye, Lime, Potash—No Rubbing, Bluing, Egg-o-Lene—Pure Food Egg Substitute (nine cents dozen), Carlo-Cide Guaranteed Automobile Gasoline Fuel, Fibro-Vac-Sure, Successful Automobile Puncture Plugger. Particulars for manufacturing these; Formula lists of others producing Bankable Results—stamp, Miller, Analytical Chemist, Tampa, Florida.

**\$61.50 WEEKLY**, introducing and selling a new gas light burner for kerosene lamps. Beautiful light. No chimney. No mantle. Samples free. Luther Manufacturing Co., Dept. 214, Cincinnati, Ohio.

**HOUSEWIVES** can't resist. Tremendous seller. Write today. Franklin Co., Dept. 4, Three Rivers, Mich.

**SELL** California Rosebuds. Sweet line. Large profits. Send for catalog today. Mission Road Co., 2810PM, West Pico, Los Angeles, Calif.

**FAST** Selling "Kantleak" Raincoat proposition. Cooper earned \$60 in 3 days. Bridge \$88 in 4 days. We deliver and collect. New 1916 swatches free. Write today. Conner Mfg. Co., 126 Palgo St., Dayton, Ohio.

**AGENTS**: Sell California Floral Beads. Best sellers; immense profits. Particulars free. Universal Supply House, Inc., Box 1743-1, Los Angeles, Calif.

**\$150.00 SALARY** for 60 days' work paid woman or man in each town to distribute free circulars, and take orders for White Ribbon Concentrated Flaxing. J. S. Ziegler Co., 7-P E. Harrison St., Chicago.

**MONEY** made spare time selling Safety Razor Sets. No cash. Better Sales Company, 300 Broadway, New York.

**WANTED**—Responsible representatives for new specialty every stenographer needs. Quickly demonstrated, absolutely convincing. Liberal proposition in return for ability. Sales Department, Box 488, Asheville, North Carolina.



**EXCLUSIVE** selling rights given for our Wonderful Triplex Folding Handbag and other sellers. None sold in stores. Write for terms and catalogue. Diamond Bros., 33 West 21st Street, New York.

**AGENTS** write for particulars fastest selling household necessity. Good profits; assured sales. Peck Specialty Co., Dept. 3, North Haven, Conn.

**AGENTS** paid \$25 a day. Inventive wonder. Half million sold and sale just started. Agents earning money. \$25-\$10-\$10-\$20 are actual proven first day records. Everybody wants new, scientific glass scraper on doorsteps. Works like magic. Automatically removes mud, snow, saves drudgery, carpets, shoes. Has 10 blades, 10 dirt outlets, adjustable brushes on compound springs. Retains for sweeping. If \$25 daily induces you write quick for territory, catalogue—great \$1,000 offer—all free. Security Mfg. Co., Dept. 285, Toledo, Ohio.

**GUARANTEED** Custom Raincoats. Biggest Commission. Largest Line. Lowest Selling Prices. Best Free Offers. Guaranteed Raincoat Co., Dept. A, Boston, Mass.

**CURLY** Hair. Wonderful Hair Curling Fluid, perfected by great German Chemist, imparts beautiful curls however listless your hair. Just introduced. Big seller for agents where demonstrated. Particulars, Warren Co., St. Paul, Minn.

**AGENTS:** Big profits selling our New \$2.50 Automatic adding machine. Quick sales. Ten a day easy. No competition. Anyone having nothing to do is positive customer. You'll be glad you wrote us. Russell Company, 5921 Indiana Ave., Chicago.

**LOOK** for our ad under this heading. It will pay you to read it. Marshall Dobbins & Co.

**WOULD** \$150 Monthly as General Agent for \$150,000 corporation and opportunity to earn a Ford auto selling Stock and Poultry remedies, Dips, Disinfectants, Interest you? Then address Rosedale Co-Operative Mfg. Co., Dept. 22, Monticello, Ind.

**\$50 WEEKLY** and up selling Mexican Diamonds. Exactly resemble genuine; Same Rainbow Fire; stand tests; sell at sight; repeat orders. Write quick for Sample Case offer Free. Mexican Diamond Importing Co., S. W. Las Cruces, New Mexico.

**COIN** books for sale here. Write for sample and prices. Coin Exchange, New Rochelle, N. Y.

**AGENTS—Salary** or commission. Greatest seller yet. Every user pays and ink buys on sight, 200 to 500 per cent profit. Our agent's sales \$250 in six days; another \$32 in two hours. Monroe Mfg. Co., No. 18, La Crosse, Wis.

**FASTEST** Dollar Seller on the automobile market. 100% to agents. Permanent repair for inner tubes. Every Minister will buy. Consumers Mfg. & Supply Co., Minneapolis, Minn.

**AGENTS—\$30 a week** and expenses; free samples; gold and silver letters for store fronts, office windows and glass almost anyone can put them on; big demand everywhere; liberal offer to general agents. Metellie Letter Co., 407 N. Clark St., Chicago.

**AGENTS** to sell Handy Dish Washer. Write for particulars. Charles Pursell, 113 Broad St., Newark, New Jersey.

**MAKE** and sell your own goods. Formulas by Expert Chemists. Manufacturing Processes and Trade Secrets. Formula Creator for stamp. Blake Mystic Company, Washington, D. C.

**AGENTS—Ho-Ro-Co Skin Soap** and Toilet Goods plan beats everything for agents' profits. "Ho-Ro-Co." 112 Lowest St., St. Louis, Mo.

**DR. SNYDER'S** Remedial Soap, Toilet Preparations, Extracts and Food Products beat everything for agents' profits. T. H. Snyder & Co., Dept. M, Cincinnati, Ohio.

**EXCEPTIONALLY** good business proposition for agents—ladies or gentlemen; particulars free. The P. Hage Company, Box 630, Los Angeles, Cal.

**QAS AIL.** Equals gasoline; 3c gallon. Eliminates Carbon, increases mileage, power and Pop. Agents wanted. Mac-O-Chico Mfg. Co., 1323 N. Dearborn, Chicago, Ill.

**\$150.00 MONTHLY** to agents introducing our line of Household Remedies, etc. Year's Contract. Wagon Free. Poultry Remedy Co., St. Paul, Minn.

**CANVASSING** agents—reliable general agents—handle Philham Laundry Wonder. Only reliable fabric; perfected after decade study in Europe and America. Sure for poster. Co-operation selling plan. Philham Mfg. Co., 315 E. Sixth, St. Louis, Mo.

**SELL** Studier Gauges for Ford Cars. Particulars Free. Studier Mfg. Co., Canton, Ohio.

**\$100.00 MONTHLY** leaving free packages "Karyash" to grocers. M. Kienel, Outfit St., Newark, N. J.

**AGENTS—If** you are looking for a repeat order business try Derrick's "Krisoline," the magic-chemical cleanser. Make your own goods and all the profits. Derrick, 1126 North Clark, Chicago.

**AGENTS—Investigate** our proposition; big profits, sells in every home; experience unnecessary; write for free particulars. West Specialty Co., 423 West Ave., Buffalo, New York.

**NEW** household necessity; not sold in stores; quick seller; big repeater. Write Eberhart Co., 6530M, Eberhart Avenue, Chicago.

**LOOK** for our ad under this heading. It will pay you to read it. Marshall Dobbins & Co.

**ONE** good man wanted in each small town to take orders for tailoring in spare time or as a regular business. Good profits. Get your own clothes at special inside wholesale prices. Perfect fit and satisfaction guaranteed or no pay. Wonderful opportunity, experience not needed. Beautiful sample book and fashion plates free. Banner Tailoring Co., Dept. 438, Chicago.

**AGENTS:** Make real money this year; not "paper money." Just think! Our Eridium (humorous) Articles \$100 in the Dark. We manufacture a complete line so that every call can be turned into a sale. Everyone amazed at the wonderful possibilities of these goods. Our Eridium Bells is easily attached to any bell and "Locates Your Light in a Jiffy" in the darkest room. Our Eridium Crucifix showing the Christ figure in startling outline through the night sells to every Catholic. Our Eridium House Numbers (just out) are selling like Ford automobiles. Our Eridium Clock tells the time in the dark. Our Eridium Match Box sells like hot cakes everywhere. Garages, homes, etc. Our Eridium Switch Plates for hotels is a big seller. Write today for best proposition you ever heard of. Sole manufacturers, The Pioneer Corporation, 1259 West 63rd, Chicago.

**DECALCOMANIA** Transfer Initials and Monograms: You apply them on automobiles while they wait; cost 2c each; profit \$1.38 on \$1.50 job; free particulars. Auto Monogram Supply Co., Dept. 1, Niagara Bldg., Newark, N. J.

**AGENTS—Steady** income. Large manufacturer of Handkerchiefs and Dress Goods, etc., wishes representative in each locality. Factory to consumer. Big profits, honest goods. Whole or spare time. Credit given. Send for particulars. Freeport Mfg. Co., 59 Main St., Brooklyn, N. Y.

**AGENTS** Wanted Everywhere—To sell our attractive theatre Brass Poster Frames, Changeable Signs, Building Directories, Brass Signs, Brass Railings, Bank Pictures, Adjustable Electric Light Brackets. Big demand; easy sales. Established 1882. Newman Manufacturing Company, Cincinnati, Ohio.

**EASY,** pleasant work for Mechanics, Shop Men, Clerks, during spare hours, will add many dollars to their salaries. Also want persons who can give full time. Big wages assured. Novelty Cutlery Co., 47 Bar St., Canton, Ohio.

**\$5 TO \$15 profit a day** selling most complete line Sanitary Household Brushes for every purpose. Our own make. Your territory awaits you. Write for attractive proposition. Fortan Sales Co., Dept. 31, 1906 Broadway, New York.

**\$15.00 MADE** first day by 13-year-old boy with Shmescene. Woman made \$4.00 first hour. Particulars free. Shmescene Mfg. Co., 423 W. 12th St., Kansas City, Mo.

**\$1,000 F301** Man per county. Strange invention starved world—agents amazed. Ten inexperienced men divide \$10,000. Korstad, a farmer, did \$2,500 in 14 days. Schlicher, a minister, \$195 in first 12 hours. \$1,240 cold cash made, paid, banked by Staneman in 30 days; \$15,000 to date. A hot or cold running water bath equipment for any home at only \$40.50. Self-heating. No plumbing or waterworks required. Investigate. Exclusive sale. Credit given. Send no money. Write letter or postal today. Allen Mfg. Co., 311 Allen Bldg., Toledo, Ohio.

**GARRETT** sold Twenty-Nine Spray Pump Auto Washers in Three days. Profits, two dollars each. A Square Deal. Rustler Co., Johnston, O.

**AGENTS** wanted everywhere, sell Weather Flowers, Clean, Pleasant, Profitable. Big Home Seller. Stoves, canvases, fairs, poultry shows, etc. Sample fifteen cents. DeWitt Sisters, R. F. D. Ten, Battle Creek, Mich.

**EVERY** Home on Farm, in Small Town or suburb needs and will buy the wonderful Aladdin kerosene (coal-oil) mantle lamp; five times as bright as electric; tested and recommended by Government and 34 leading universities; awarded gold medal; one farmer cleared over \$500 in 6 weeks; hundreds with rigs or autos earning \$100 to \$200 per month; no capital required; we furnish goods on time to reliable men; write quick for distributor's proposition, and lamp for free trial. Mantle Lamp Co., 623 Aladdin Bldg., Chicago.

**AGENTS:** Big Hit; Our 5-Place Aluminum Set is all the rage. Cheaper than Enamel Ware. Sells like wildfire. Guaranteed 20 years. Retail value \$5.00. You sell to yourselves for only \$1.85. Biggest seller of the age. 8 more sales out of every 10 shown. Others cleaning up \$10.00 to \$20.00 a day. Answer this quick to secure your territory. Div. G-35, American Aluminum Mfg. Co., Lemont, Ill.

**WE** require general representatives and local agents to demonstrate and sell our individual lighting systems, portable lamps and lanterns for use in stores, homes, streets, etc., which are distinctly superior to, and more economical than, any other known method of lighting. If you wish to establish a permanent and very profitable business of your own, tell us in confidence, your business experience, age and other qualifications. Pioneer Gasoline Lighting Company, 8 East Kinzie St., Chicago.

**AGENTS:** Get an easy seller. Sanitary All-Metal Bread and Pastry Board and Rolling Pin is making big hit. Make \$25 to \$40 every week. Smith, Ohio, sold 33 one day. Profit \$13.64. Sells at sight. No talking necessary. Free Sample to Agents. Write quick for appointment and territory. Union Mfg. Co., 133 Main St., Cambridge, Ohio.

**AGENTS:** 50 calling cards 10c. P. Shepard, Rome, N. Y.

**AGENTS—\$400 profit.** Sign letters for store and office windows. Samples and particulars free. Inter State Letter, 2453 N. Halsted St., Chicago.

**AGENTS.** Make Big Money; fast office seller; particulars and samples free. One Day Pen Co., Dept. 2, Baltimore, Md.

**AGENTS:** Earn big commissions selling made to measure suits for \$15.00. No more; No less. Real \$25.00 values. No experience necessary. Chicago Woollen Mills, Dept. C, 333 Jackson, Chicago.

**AGENTS—Sell** fish-baking imported 25c 68 rugs, \$1 each. Carter, Tenn., sold 115 in 4 days. Profit, \$37. You can do same. Write for sample offer selling plan; exclusive territory. Sample rug by parcel post prepaid. Geo. H. Condon, Importer, Stoughton, Maine.

**"GOLDENE"** Sign Letters—1,000% profit. Particulars free. Johnston Co., Quincy, Ill.

**AGENTS—We** manufacture quick-selling specialties, repeaters, and teach you practical salesmanship free. G. Home, 1351 Warren, Chicago.

**MAKE** and sell "Flamingo Extracts," "Polishes," "Perfumes," "Proprietary Preparations," "Toilet Requisites," etc. Reap entire profits of your labor. Our high-grade manufacturing formulas and trade secrets tell how. Valuable collection of formulas and big catalogue free. Ideal Book Shop (D-21, Irving Station, Chicago).

**LOOK—Send** us your address and we will mail you a surprising sample. American Mfg. Co., 201 Eastern Bldg., Desatur, Ill.

**AGENTS:** Protector Burglar-Alarm for doors and windows is a wonderful new patented safety first device. Insures your safety and protects your valuables. Made of steel, Nickel-plated. Attractive appearance. No wires or batteries. Fully guaranteed. Cheapest burglar insurance. Delivered prepaid on receipt of \$1.00. Write for exclusive territory. The Protector Co., 20th Century Bldg., Chicago.

**MAN** or Woman to travel for well-established firm. No commission; \$1,170 first year, payable weekly, pursuant to Contract. Expenses advanced. G. E. Nichols, Philadelphia, Pa., Pepper Bldg.

**"FLOSSY"** New Invention for everybody. See our advertisement, Page 166.

**"HIPPY"** Curtain Stringer Slips on and curtain rod, strings curtain onto rod one-fourth usual time. See advertisement, Page 166.



**AMAZING**, new invention. Marvellous adding machine. Details \$7.50. Adds, subtracts, multiplies. Does work of 1200 machine. Five-Year Guarantee. Offices, stores, factories buy from one to dozen. Enormous demand. Every demonstration sells. Write quick for trial offer and protected territory. Dept. P3L, Calculator Corporation, Grand Rapids, Mich.

**WANTED**—Active men to sell simplest gas plants; no experience required; can make \$300 to \$500 per month; others are doing it, so can you. Ambrose Simplex Gas Plants Co., 154 Whiting St., Chicago, Ill.

**HIG** Profits for You! Manufacture Harley Crisp, New Confection, 5c packages costs you 1c. Machine instructions complete \$7.50 prepaid. Send 10c for samples. Harley Crisp Co., 1295 Broadway, San Francisco.

**AGENTS**—Stamping names on Pocket Key Protectors; sample Check with your name and address, 13c. Stamping Duplicates, Emblem Checks, Check Folds, Name Plates. Hart Mfg. Co., Desk 2, 303 Degraw St., Brooklyn, N. Y.

**EARN \$50 to \$100** monthly distributing Parker Hosiery to repeat customers at mill prices. All or spare time. Protected territory. Credits. D. Parker Mills, 2733 No. 12th St., Philadelphia, Pa.

**\$5 COMMISSION** each sale and repeat orders. Traveling salesman every state. Main or side line. New, rapid selling automobile accessories used all makes cars. Samples loaned. Weekly settlements. Toledo Cable Co., 119 Davis Bldg., Toledo, O.

**YOU** can be your own boss with our Key Check outfit. Good for \$5 a day stamping names on pocket key checks, fobs, etc. Sample check with your name and address, 15 cents. Prase Die Works, Dept. M., Winchester, N. H.

**AGENTS**—\$40 per cent profit; get our monograms for autos and motorcycles, etc., by transfer method. Western Motorist Accessories Co., Cheyenne, Wyoming.

**OUR** line of sanitary brushes, mops and dusters is a winner. So is our proposition. Rich territory waiting. Agents wanted now. Sanford Brush Co., 544 W. Lake St., Chicago.

**AGENTS**—\$50 a week. Will show you how. Genuine Gold Leaf Window Letters. Chicago Letter Co., 840 Alameda St., Chicago.

**STEAM-NO-MONEY** for eye glasses, wind shields; every auto owner a customer. Live agents, 700%. Send 10c for 25c sample. Gray's Sales Agency, Port Huron, Mich.

**WHO** wants to make more money selling brushes that every household needs? Special method of getting entrance to demonstrate. Fuller Sanitary Brushes are nationally advertised—largest output—best terms and prices—western distributing stations. Your territory is valuable. Write, Fuller Brush Company, Hartford, Conn.; Rock Island, Ill.

**TURN** spare time into dollars. Something new. No canvassing or investment. Daymark Co., Desk 55, St. Louis, Mo.

**HUGE** profits, selling Nissen Sanitary Brushes, Auto Washers, Brown Beauty Adjustable Floor Mops, Dusters, Busters, and other specialties. Big line. Fast sellers. Write today. Silver-Chamberlin Company, Department M, Clayton, New Jersey.

**SIGN** Letter Agents and Printers: 50%-Profit Gold and Silver Sign Letters for Stores and Office Windows. Anyone can put on. Big demand. Free samples. Metallic Letter Co., 404 N. Clark St., Chicago.

**MERCHANTS** will order them. Kellner of Chicago sold the first ten "in no time." He says the Ever-Ready changeable sign is the greatest seller he ever handled. Profits 95c on every \$1.50 sale. If you are making less than \$2.00 on home write for our proposition. Changeable Sign Co., 581 E 102nd, Cleveland.

**WANTED**—Reliable Men and Women to place our Engine in stores and appoint sub-agents. Takes the place of signs in baking and cooking at less than 1c doz. Chas. Morrissey Co., 4163-5 Madison St., Chicago.

#### SALESMEN WANTED

**WANTED**—Salesmen, cooler men with children, tailoring or retail experience, to take charge of an agency for new proposition to be placed in every country. No investment required. If you can qualify it means at least \$25.00 to \$40.00 weekly. Profitable, permanent business. McGregor Co., 511 E. Franklin, Chicago.

**SALESMEN** Wanted—Get into automobile accessory business. Act as district representative Doyle Fuel Regulator, also Doyle Speed Governor. Two quick selling, big profit-makers. Each sells \$5. You make \$2.50 each—100% on investment. Fuel Regulator increases mileage of car 25% to 75%. Speed Governor regulates speed delivery cars—saves time, reduces up-keep. Hugh Miller, Syracuse, made \$47 first three days. Your opportunity, too. Send \$2.50 for Fuel Regulator or \$5 both devices. Return C. O. D. If you can't sell first car owner you need. Big advertising campaign helps you. Leads furnished. Territory going fast. Hurry! Doyle Auto Products Co., 1675 Broadway, New York.

**SALESMEN** To sell Groceries, Paints, Lubricating Oils, Block Remedies, Automobile Supplies to farmers, ranchmen and other consumers at wholesale; profitable, steady, desirable, satisfaction guaranteed; 45 years in business. Write for particulars. Lowrie & Bros. Co., 1716 S. State St., Chicago.

**NEW \$2.50 Automatic Adder** sells quick from demonstration. Big profits, no competition. Every business man buys. Bassett, 5921-D, Indiana Ave., Chicago.

**ATTENTION:** If you live within 75 miles of Philadelphia, earn exceptional profit selling "New Idea" Sanitary Brushes. 67 Varieties. Household necessities. Original method of gaining entrance to demonstrate secures ten sales from fifteen calls. Fuller Brush Company, Philadelphia, Pa.

**WANTED**—One responsible man in each county for exclusive sale Automatic Grain Separators direct to farmers. F. A. Lester, P. O. Box 345, Chicago.

**WHERE** you ever offered a grocery store? Our proposition is better. Let us tell you how you can handle Flour, Canned Goods, Provisions—an entire line of Groceries, as well as Paints, Rooding, Stock Foods, Automobiles and Machinery Oils and Greases. No rent to pay, no investments in stock. Large orders taken from samples. Goods of guaranteed and proven quality. Selling expedients not necessary. Very profitable work for "workmen." Address R. S. Hill, President, Pitchcock Hill Co., Chicago. Reference: Any bank or express company.

**OUR** advertisement under Agents Wanted will interest you. Read it. Marshall Dobbin & Co.

**\$500 PER** Month side line, selling useful low-cost gift and advertising specialty. Attractive. Entirely new. Patent pending. Every smoker and every family wants it; invisible Safety Match-box Holder. Two styles, 6 of each, \$1.40 postpaid, deducted first order. Fred M. Glendinning, Manufacturer, (Dept. M-21), Galesburg, Illinois.

**SALESMEN**—Appointed with grocery trade. Large demand; liberal commission; pocket sample. Write Salesbook Co., Dept. P, Chicago.

**THE RAZOR** Strapper—Rings and Straps all razors and blades. It's New—Simple—Efficient. Postpaid, One Dollar. Salesmen Wanted. Webster & Nobbs, 24 Broad St., Boston, Mass.

**FORD** Specialties. Local representatives of good character desired every State. Miller, 101 West 16th Street, New York.

**SALESMEN:** Your clothes furnished free of cost for soliciting applications for our Tailoring line during spare time, in all towns you make. Our line features 300 patterns, half of which can be profitably retailed from \$15 to \$25. Write for full information. United States Tailoring Co., 919 W. Jackson Blvd., Chicago.

**SALESMEN**—We require at once, men of character and ambition for permanent position; cover small territory and live at home; a very fine income and opportunity is assured. Rex Typewriter Co., Sales Dept. P, Steger Bldg., Chicago, Ill.

**YOUNG** men everywhere as cigar salesmen. Start \$20 Weekly. Neway Sales Co., Holbrook, Mass.

**SALESMEN:** The Nelson Hines clothes line puts the old-fashioned clothes pin into the discard. Simple, indestructible. The greatest boon to housewives invented in a decade. Are you also to something new, something big? Get present-day terms and territory now. John Nelson, Patented & Mfr., Stamford, Nehr.

**\$50.00 PER** month selling the Emul Gum Case as a side line. Sample 25c. Emul Co., Box 603, San Francisco.

**\$7.50 COMMISSION** each sale and repeat orders; traveling salesman among general mercantile trade, every state; weekly settlement; no competition; pocket sample. Toledo Cable Co., 200 Davis Bldg., Toledo, O.

**WANTED**—Capable Men to Sell "Heat" Automobile accessories direct to car owners. Good commission. Reliable men only. No free samples. Jackels Campbell Co., Kansas City, Mo.

**SALESMEN**—Wanted everywhere to sell Ajax Chemical Fire Engines, Minimum Commission \$40 on every Engine sold. An average of one or two machines a week would earn you \$2,000 to \$4,000 a year. Factories, Stores, Industrial Plants, Private Estates, etc., all use Ajax Engines. No capital required. Goods well advertised. Ajax Fire Engine Works, 25 W. Liberty St., New York.

**SALE MEN** Wanted—Broom straw has gone up. Our Fibre and horse-hair brooms is the best house to house proposition on the market today. Easy seller. Costs 37c each. C. O. D. P. O. B. Chicago, sells for 70c. Write at once. Territory protected. Jap. Broomstick & Son, 57 E. 43d St., Chicago, Ill.

**SALESMEN**—Sell beautiful 22x58 Art-kraft felt rugs for \$13.50 per doz. Your profit \$2.50 per doz. Kalso, Battle Creek, Mich., sold 30 doz. last week, his profit \$75. Prepaid sample, \$1.00. E. H. Condon, Mfr., Stanington, Maine.

**SALESMEN**—Get our plan for Monogramming Automobiles and motorcycles by transfer methods. Very large profits. Monogram Accessories Co., Mansfield, O.

**WANTED**—Representatives everywhere. Exclusive territory. Gold sign letters for stores and office windows. Any one can put on. Write today for free sample. Metaltile Letter Co., 403 N. Clark St., Chicago.

**EXCLUSIVE** county rights. Sell Tankik; modern auto fuel. Profitable. Tankik Chemical Co., Cleveland, Ohio.

**"FLOSSY,"** New Invention for Everybody. See our advertisement, Page 165.

**EARN \$5,000 to \$20,000** yearly. New business necessity. Details \$5 to \$500, 100-200% profit. Purchase satisfied or money refunded. No competition. Exclusive territory. Free samples. Savers, 408 Walnright, St. Louis.

#### HELP WANTED

**WANTED:** Young men seventeen to twenty years old to learn the trade of a boiler in iron foundry making high-grade machinery castings. Term of service, three years, with attractive and steadily increasing pay while learning trade. For further particulars, write The Hendry Machine Company, Torrington, Conn., Foundry Dept.

**\$25.00 WEEK** paid chauffeurs. Learn while earning. Sample lessons free. Franklin Institute, Dept. T-502, Rochester, N. Y.

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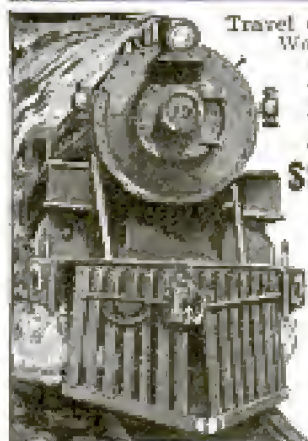
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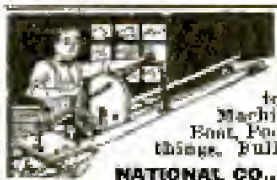
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33,000 sq. ft. of additional floor space, thousands of dollars' worth of new equipment, plenty of room for students to work, at 687-89-91 Woodward Ave., which we are now occupying in addition to our building at 11-19 Seiden Ave. Our school has grown by leaps and bounds, students come from all over the world. Men have left after graduating and started in business for themselves; others have accepted good jobs both in Detroit and over the country. Their work has proven that we teach them right. We are constantly adding new equipment. Our electrical department is thorough and complete and in charge of the most competent instructors.

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We have completed arrangements with the Auto factories to put them in touch with men who intend going into business for themselves. Think of getting inside information. The factories are looking for trained men to represent them. Men who know the auto business from A to Z are in biggest demand. Come here and start right—get the information first-hand and don't wait. Remember, you can enter classes any time, any day. The price of course is based on giving full value. Graduates in the complete auto course are competent to handle farm tractors.

### Act Quickly—Now—Don't Wait

### SEND THIS COUPON TODAY

MICHIGAN STATE AUTO SCHOOL

302 Auto Bldg., 687-89-91 Woodward Ave.

DETROIT, MICHIGAN, U. S. A.

Gentlemen: Send me absolutely FREE "Auto School News" and New Catalog or better still, you can expect

me about .....

Name .....

Street .....

City .....

Fill in the coupon and mail it now; get full particulars, get "Auto School News" and New Catalog. They are both absolutely free. Or better still, jump on the train, as hundreds have done, and come to Detroit, the "Heart of the Automobile Industry," and learn right. We have no branches. Write or come direct to this school.

## Michigan State Auto School

The Old Reliable School

A. G. ZELLER, Pres.

302 Auto Building

687-89-91 Woodward Avenue

DETROIT, MICHIGAN, U. S. A.

### DETROIT THE HEART OF THE AUTO INDUSTRY



44 AUTOMOBILE FACTORIES 140 ACCESSORY FACTORIES



With the New Building and Thousands of Dollars Worth of New Equipment, Our's is the Largest Exclusive Auto School in the Country

**EARN \$75. TO \$300. A MONTH**



We teach the newest and best way to re-bore cylinders as a part of the complete Auto Course. No need to have big, heavy, expensive machines. This is very important instruction.



These men are getting final instructions after they have taken down and rebuilt a new up-to-date 6 cyl. motor.



This is a partial view of our Chassis room showing eight up-to-date chassis for students' use.



A new 12 cyl. motor connected to our Sprague Electric Dynamometer in Block Test Dept. for students' use.



**DECEMBER 1918 CLASS IN MECHANICAL LECTURE ROOM**

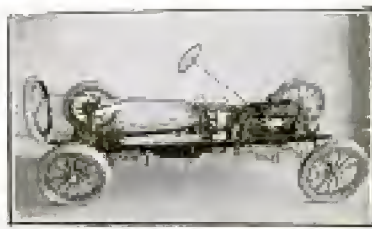
This is the first work a student receives. A 6 cyl. 1917 Haxon "Cut-open" chassis is used to make perfectly clear and practical the first instructions. There were 350 men set for this picture. The Electrical Lecture room is the same size. The classes are divided so that more intense work can be done on each subject. Every man is given personal help and his progress through the school is watched carefully.



This is a section of the Drilling, Welding and Cutting Department. Each man handles the torches and works with an individual outfit.



View showing about 18 motors in the Block Test Department. Sprague Electric Dynamometer shown in center background.



A close view of Haxon "Cut-open" chassis used in Mechanical Lecture room. Hidden parts are cut open and electric lighted.



Students getting personal instructions on Willie-Knight 1917 chassis.



Students making final tests on Maxwell 1917 unit power plant motor.



Complete working Delco System as used in Buick, Hudson, and Packard Twin "8."



Battery Charging room, showing lighted switchboard and distilled water rack.

These cuts were all made from actual photographs taken in our school.

**Use the Coupon** on left-hand page

**-DO IT NOW**

**Don't Even Hesitate**



# Marking the Coupon

**T**WENTY years ago, in the city of Boston, a group of men met to discuss an educational problem. A new condition of affairs had come into existence. In many lines of business it was a vital necessity to find more trained men. The progress of these businesses was slow because trained men could not be found. For economic reasons, it was impractical for a large percentage of the population to attend resident schools.

There was a crying need for a new system of education that would bring thorough training to ambitious men at a trivial cost.

The result of this conference was the founding of the American School of Correspondence. In 1897, under the laws of the Commonwealth of Massachusetts, this now world famous school was chartered as an educational institution.

## The Vital Need of Training

**T**HE need for trained men that the founders of the American School saw in 1897, is more evident today than ever before.

All lines of business are like giant armies. At the sound of a martial air hundreds of thousands will rally to the colors. Yet, without skilled officers, the efforts of these patriots offer but puny resistance to an organized attack directed by officers who have learned the game of war.

In modern business the privates are the untrained men who hold the smaller positions. The men who direct the work of the "privates" are trained men. They know the "Reasons why" and have a thorough, broad and comprehensive understanding of the entire business.

It is men like this that are needed.

One "man who knows" can direct the work of hundreds of skilled workmen.

Modern business like armies, needs thousands of officers. Even though the master mind of the general may conceive the plan for accomplishing certain work, and even though the privates be men who know how to shoot and how to march, thousands of colonels, majors, captains and lieutenants must direct the work of these privates and see that the privates carry out the orders of the general, or the army is a failure.

It is lieutenants, captains, majors and colonels that are needed in a modern business.

## You Need More Than Skill

**A**ND it does not necessarily follow that because a man is a good workman that he will become "a good boss." A man can become so skilled in the operation of a machine that his work will be considered perfect. Yet, if he has not the fundamental, broad, comprehensive knowledge of what the business is doing he cannot become "the boss." Of course, a knowledge of the work the employes are doing is vitally important, and skill in doing this work is one of the most valuable assets that a man can have.

But skill alone is not enough to make a man "the boss." To get the broad, comprehensive knowledge of the business and to understand why each operation is necessary, a man must have training. Some men are trained to become leaders before they enter business. Others become workmen first and these men, who have the practical experience will find golden opportunities through the course of training in the American School.

For twenty years the faculty of the American School have been giving men the kind of training that they need in order to hold the higher positions. They have investigated every line of business in which they offer courses to ascertain just exactly the knowledge that a man must have in order to lead. This is compiled into small,

# American School

of Correspondence, Chicago, U.S.A.



# —and What it Means

compact lessons and written in simple, easily understood English so that a man can grasp it instantly during his idle hours.

## The Reward of Training

**T**HE hours that are spent in getting this fundamental training are repaid many, many times over. Skilled men are paid higher salaries.

If you were to calculate the number of hours that were required to attain the training and the advance in salary that this training brought about, you would find that the hours spent in study were the most richly rewarded in a man's life.

The educational standard for men who hold higher positions is becoming higher each year. Employers are demanding more because the rate of competition is harder. Employers are buying the finest materials and the finest machinery. To direct the work of this fine machinery and to use these fine materials, more skilled employees are needed.

But what is more important: highly skilled men with practical experience who have a broad, comprehensive knowledge of the business, must be found to *direct* the work of these employees.

Today there are golden opportunities for every ambitious man in America to answer the call that is being sent out for trained men. The American School offers the way for you to get that training during your idle hours.

## The Way Is Well Marked

**D**URING the last twenty years thousands and thousands of men have found their way to success through the courses of training offered by the American School. The home study offered by this institution is not untried. Students from all over the world have read the words of inspiration that were written in our advertisements. They made their marks in coupons, re-

ceived the bulletin and today are filed still with thousands of letters that tell stories of success.

Everywhere you look, in every line of business, you will see how men have risen to high positions by getting broad, comprehensive training in addition to their practical experience. What these men did points the way for you. The same men who worked to put other men into high positions, are waiting to serve you. After years of study, we know just the things that you need in order to obtain a high position. Now they are offered to you. It is not necessary to give up your present employment or make a drudge of yourself.

Just make your mark in the coupon now. Check the position that you want to fill and we will tell you how you can fit yourself for it during your idle hours. You will be under no obligation.

## Make Your Mark In the Coupon

**W**HY postpone sending the coupon another hour? All about you is the proof that the only way to success is thorough *training*—and this coupon brings you a vital, inspiring story of how to get that training right in your own home. Others have shown the way.

Making the coupon has meant the dawn of a golden day to thousands all over the world. Their successes are beacon lights to guide you.

And they are calling this very hour. Your ambition is calling you. Opportunity is at your door and saying, "send the coupon—it has meant a great deal to others." Find out what it will mean to you.

Sending the coupon puts you under no obligations. Send it now. Just put an "X" before the position you want to fill—and we'll tell you how you can fit yourself for it. Send the coupon.

American School of Correspondence, Dept. G1192 Chicago, U. S. A.

Gentlemen: Please send me booklet and tell me how I can fit myself for the position marked X.

.....Electrical Engineer	.....Business Law
.....Elec. Light & Power Supt.	.....Business Manager
.....Hydroelectric Engineer	.....Auditor
.....Telephone Engineer	.....Accountant
.....Architect	.....Cert'f'd Public Acc't
.....Architectural Draftsman	.....Stenographer
.....Building Contractor	.....Bookkeeper
.....Building Superintendent	.....Fire Ins. Inspector
.....Structural Engineer	.....Fire Ins. Adjuster
.....Structural Draftsman	.....Fire Ins. Expert
.....Mechanical Engineer	.....Sanitary Engineer
.....Mechanical Draftsman	.....Master Plumber
.....Civil Engineer	.....Plumbing & Heating Est.
.....Steam Engineer	.....Heating & Vent. Engineer
.....Shop Foreman	.....Reclamation Engineer
.....Shop Superintendent	.....Automobile Engineer
.....Sheet Metal Draftsman	.....Automobile Repairer
.....Lawyer	.....High School Course

We also prepare for civil service examinations in all engineering subjects.

Name.....

Address.....

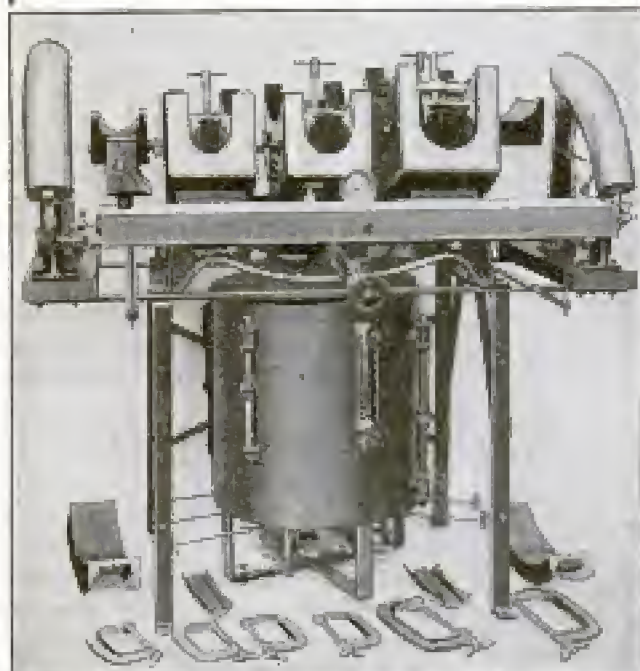
**American School**  
of Correspondence, Chicago, U.S.A.

Dept. G. 1192



## 30 DAY COURSE IN TIRE REPAIRING **FREE**

Complete Tire Repair Outfit  
Less Than \$250.00



With this outfit and our course of free instruction, you can start up a good business.

## Learn to Repair Tires

Bigger opportunities than in any other branch of the Auto business. A broad claim, but easy to prove. Only stop and think!—you know it's true. Listen! Not one single Auto factory can build cars fast enough. Everybody is car crazy, and the craze is growing. 2,000,000 autos now in use. Four tires to each car. That means 8,000,000 tires to repair. Just think of it—8,000,000 tires! Each car wears out its cost in tires alone. Punctures and blowouts are common. Vulcanizing, patching, retreading, etc., must be done. Retreading alone—the new and better process—brings big money.

## Earn \$3000 to \$8000 a Year

Begin now. In almost every city, town, village, and cross corners, there is a fine chance to start. We know the places and put you next. Just a little money starts you in a business of your own. We guarantee to make an expert of you in 30 days free of charge. Write today for free catalog, or why not take a run over to Detroit and investigate personally? Don't let the chance slip by. Investigate now.

### Reliable Tire Repair School

102 Reliable Bldg., DETROIT, MICH.

FATHERS! This is a great opportunity for that boy of yours. Start him in the Tire Repair business. You'll always be glad. When in Detroit, look us up. We'll be glad to show you through.

#### COUPON

#### RELIABLE TIRE REPAIR SCHOOL

Send me your free catalog and full particulars about the tire repair business.

Signed.....

Address.....

P. M.

Please Mention Popular Mechanics

# The New Way

Only 10 easy lessons  
bring speed of 80 to  
100 words a minute  
guaranteed.



A WONDERFUL new method of acquiring skill on the typewriter has been discovered. Already thousands of stenographers and other typewriter users who never exceeded 30 to 40 words a minute are writing 80 to 100 words with half the effort and with infinitely greater accuracy than they ever could before and they're earning salaries increased in proportion.

## Earn \$25 to \$40 Per Week

Special Grammaric Finger-Training Exercises bring results in days that ordinary methods will not produce in months. Among the thousands of operators who have taken up this system are hundreds of graduates of business colleges and special typewriting courses—many were so-called touch typewriters—yet there has not been a single one who hasn't **doubled or tripled** his or her speed and accuracy, and the salaries have been increased from \$8 to \$15 a week (their former salaries) to \$25, \$30 and even \$40 weekly. And the New Way is *amazingly easy* for anyone—there are only ten lessons and they can be quickly learned at home.

### FREE—Wonderful New Book

If you are ambitious to get ahead—if you want to make your work easier—if you want to put more money in your pay envelope—get this book at once. It will be a revelation to you as to the *speed and salary* that are possible to typists. Address

THE TULLOSS SCHOOL, 122 College Hill, Springfield, Ohio



## ART MAGAZINE

Publishes cash lessons and articles on Cartooning, Designing, Illustrating, Lettering, and Chalk-Talking. Critiques amateur work. Full of interesting and helpful information for artists and art students. Satisfaction or money refunded. 10 cents a copy. \$1 a year.

Send \$2 NOW, stamps or bill.



STUDENTS ART MAGAZINE, Dept. 234, Kalamazoo, Mich.

## LEARN TO WRITE ADVERTISEMENTS EARN \$25 to \$100 A WEEK

We can positively show you by mail How to increase your salary. BOOK MAILED FREE. PAGER-DAYTON CO., 137 Page Building, Chicago, Ill., or 124 Avenue B., New York

## LAW

## STUDY AT HOME

Complete Resident University Course by mail. Also Lawyers' Law Course. LL.B. Degree conferred. Indorsed by Bench and Bar. Strong Faculty of Distinguished Jurists and Lawyers. Catalog free. Oklahoma City University, 106 Grand Building, Oklahoma City, Okla.



## Learn How to WRESTLE

In Your Own Home  
By Mail

Yes, learn to become an expert wrestler right in your own home, by mail, from the greatest wrestling instructor known. Be an athlete, be strong, be healthy. Learn how to throw and handle big men with ease. Learn to defend yourself. All taught in our course of lessons, and illustrated with hundreds of charts and actual photographs by

## Farmer Burns and Frank Gotch

Farmer Burns, "the great old man of the mat," taught Frank Gotch, the present World's Champion, all he knows about wrestling, in detail. He will now teach you Scientific Wrestling—Physical Culture—Judo—Self Defense. Every man and boy in America, no difference what age, needs this wonderful course of lessons. Write today—your name, age and address on postcard or letter brings you our free book absolutely free—no obligation of any kind. A splendid treat in wrestling and physical culture. Write today telling your name.

Farmer Burns School of Wrestling, 1192 Range Bldg., Omaha





# You Men Who Want to Find Success Through ELECTRICITY

Three minutes spent in reading this article will be well repaid



Dr. Charles P. Steinmetz, A.M., Ph.D.,  
Chairman Advisory Board  
New York Electrical School

"There is an enormous field for the electrical worker"—says Dr. Charles P. Steinmetz, the foremost Electrical Engineer in the world, whose salary with the General Electrical Company is reputed to be over \$100,000.00 a year.

It is indeed an enormous field—a field of unlimited opportunity—a field which has hardly as yet begun to grow. With all the modern applications of electricity to railroads, transportation, power drive, automobiles, telephones, telegraphy, signalling, lighting, heating, household conveniences, and thou-

sands of other applications, new uses are still being rapidly developed. There are, in fact, more big money-making opportunities in this field today than there are men trained to fill them. Men ask us about the opportunities for success in the electrical field. We have seen hundreds of men with little or no electrical experience and other men, who for years had been plodding along in an electrical rut, go out into the world after a few months of proper training, and start to make things hunt. We have hundreds of letters from just such men. Here is what some of them say:

## Letters from Successful Men

"I have done well since leaving school and am now Superintendent of the light, telephone and steam heat company here."

"Ten months after I left you I was given charge of this station. I saved at least 3 years by taking your course instead of working up as an apprentice."

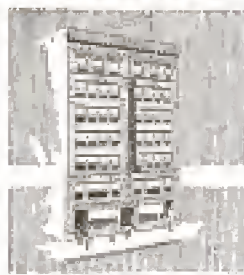
"I have been in the contracting business here in Avon since Jan. 1st, 1914, and am using time."

"I have sole charge of all motors, lights, electrical designs and appliances, and in being able to hold this position I give all credit to the New York Electrical School and your personal interest in me, which and lately I did not realize, would be so wonderfully beneficial to me."

"We had no electrical experience before taking your course and just one year since leaving school are working side by side with men of from five to ten years' experience."

"I am thanking you for the service you did for me while attending school as I accepted a position as Sales Engineer for the New England Appliance Co., of Boston, Mass. My position takes in all of New England territory."

"Since graduating from your school, I have been able to handle successfully any problem that has come before me in my line of electrical work and I wish to express my feelings for the school and its methods of training."



The New York Electrical School

What is this school which gave these men and four thousand five hundred others such a splendid start in the electrical field? It is the NEW YORK ELECTRICAL SCHOOL. It is like no other school or college in the country. It is a school which cuts out long years of apprenticeship or long years of study by its unique method of instruction—the "learn by doing" method.

**Learn by Doing** To learn Electricity you must handle the actual apparatus with the help of a practical man who knows. You must do the real work which you will be paid for later on. In other words you must learn by doing. That is the method of the New York Electrical School—a method proved successful by our graduates.



In the New York Electrical School you learn in a few months—seven months is the usual time required—what would take you years to learn plodding along in an electrical apprenticeship. You waste no time doing over and over again the same old task. You go ahead all the time. Here at the New York Electrical School you are doing something different every minute, and you do everything thoroughly.

You do the actual work. If you are learning to wire a house you have actual floors, walls and ceilings in an actual ten-room apartment to work with. If you are learning how to run compound generators in parallel, you have the same type of machine and the same type of load as used in power houses. The work you do is actual work, and you learn to do it right. All the time a competent instructor stands behind you to see that you miss no point of importance.

Don't you think that with this kind of training you are assured of success in the electrical field?

Our course begins with primary cells, magnetism and electrical measuring instruments. Then you pass on to the installation and operation of every possible system of bells and annunciators, together with the practical operation of telegraph and telephone systems, wireless telegraphy and wireless telephony. Electrical drafting gets its share of attention, and you continue with interior light and power wiring, electrical illumination and testing, electrical signs and flashers.

A most important part of the course is estimating and contracting, including business methods in contracting, estimating cost of material and labor, how to submit estimates for work and methods employed in getting work, with lessons on how to compile information on work done to assist in estimating on future work.



As the course progresses you learn to erect switchboards and to operate motors and generators of every type. You learn the methods of their installation and maintenance. You take up storage batteries—the manufacture of modern types, different rates of charging and discharging efficiency, rules governing output, care of accumulators. Direct and alternating current practice are covered in full detail.

And last of all you make a thorough review of the work, with practice of armature winding and experience in general repair and machine shop work. In this way the knowledge that you gain stays with you.

Our equipment for all this work is complete and up-to-date. The seven floors of our building make up one complete and tremendous workshop, with every facility for thorough and accurate electrical work.

## You Start Higher Up

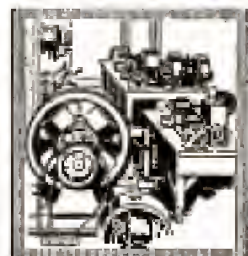
When you graduate from the New York Electrical School you are ready to step right into a position of responsibility. You are an expert, not a dabbler in electricity. Yet the course is so simple that anyone with a common school education can take it. We have no requirements for entrance.

The length of the course we have mentioned is seven months. But that depends on you. You can start any time and work as fast or as slow as you like. You do not have to keep up with anybody else. No one holds you back. Your work is entirely individual all the way through and you can stay till you feel you have learned it all. Whether you devote seven months or more than a year to the course, the cost is the same.

We have both day and night sessions, but most of our men take the day sessions because it naturally enables them to complete the course quicker.

## New York the Center

We are located in the heart of New York City and you can see the advantage of that. New York is the heart of everything electrical—there are big plants nearby, electrical exhibitions, libraries and facilities for good, quick work in an atmosphere of industry.



A large number of our students come from other cities, from all over the United States. They realize the advantage of coming to New York to learn electricity. About 4500 in all have gone out from our school into success. You can do the same. We believe that with us you can learn more thoroughly and more quickly than anywhere else because we give you practice. We teach you only what you use.

## And Now

If you have an ambition to make a name for yourself in the electrical field you will want to join the New York Electrical School. It will be an advantage to you to start with our February sessions. Then you should hurry to send for our 64-page book which tells you all about the school, with pictures of our equipment and students at work, and a full description of the course. You need not hesitate to send for this book. It is FREE to everyone interested in electricity. It will not oblige you to send for it. Send the coupon or write us a letter. But write us now while you are thinking about the subject of electricity. Address—NEW YORK ELECTRICAL SCHOOL, 44 West 17th St., New York, N. Y.

Mail this coupon today for free book

NEW YORK ELECTRICAL SCHOOL, 44 W. 17th St., New York  
Please send FREE and without obligation to me your 64-page book.

NAME.....

ADDRESS.....





**"Smith, There's Your Office  
Your Salary to Start  
Will Be  
\$3500.00"**

## "You Are The Man We Want"

*"We have lost a lot of money on shipments this last year, and we've hired you because we know you can save us money."*

Many a trained traffic man has been talked to like this by the "big chief." Plenty of similar jobs waiting for trained men to fill them. The position is one of importance and dignity. The T. M. "sits in" at many a Directors' meeting because of that very importance, and when the job is important the pay is big. Why don't you become a Traffic Manager?

## 95,000 Trained Traffic Men Are Needed Now

There are 500,000 shippers in the United States. 100,000 are able to employ Traffic Managers. There are now 3,000 to 5,000 Traffic Managers in the country. That leaves 95,000 shippers without Traffic Managers; a man they need; a trained man who can save them money.

### Study Under A Master

H. E. Fairweather, Dean of the Interstate Traffic School, is an expert of national repute with years of practical experience behind him. He is master of tariffs, having in the past served some of the largest railroads in the country. You get practical instruction—not theory. Over 37,000 Tariffs in our files. Each student's lesson paper is graded personally by actual Traffic managers. Unlimited consultation service for two years after graduation.

### Are You On The Wrong Job?

Thousands of men are on the wrong job; right perhaps, as far as the work is concerned, but wrong where the pay comes in. Few men can be contented with a job that doesn't pay well or offer a good chance for steady and sure advancement.

Far-sighted, ambitious men are climbing out of ruts and seeking opportunities in special fields. The man who specializes today is the big man of tomorrow. To become successful and highly paid Traffic Manager you don't need "special talent"—only a common school education and an hour or two a day of your spare time.

## PREPARE NOW FOR THE BIG JOB

Thousands of shippers realize their need of a trained traffic manager. But the supply of trained men doesn't begin to meet the demand. Ask any shipper if the Trained Traffic Manager isn't highly important and well paid. Ask him if it wouldn't be a good profession for you to get into.

### Prepare Now

Send for our free catalog. It tells who we are, what we teach, and how we do it. We'll train you to fill an important, responsible position at big pay and help you find a place when you are trained.

### FREE—New Book

Our free book on Traffic tells all about it; explains clearly, concisely. Don't pass this opportunity. Use the coupon NOW. You'll always be glad.

**Interstate  
Traffic School  
102 Traffic Bldg.  
Ft. Wayne, Ind.**

Gentlemen: Send me immediately free and prepaid your new book on the Traffic Profession.

NAME.....

ADDRESS.....

**INTERSTATE TRAFFIC SCHOOL  
102 Traffic Bldg. FT. WAYNE, INDIANA**



# Our Graduates are Making

## \$80 to \$250

### AND MORE PER MONTH

## We

**T**HE Best Paying Positions in the Auto business are secured through this school. Our thorough and practical instruction has placed many of our graduates in positions where they are getting up to \$12,000 and \$20,000 a year in salary, or in profits from their own business.

Many others are Expert engineers, Chauffeurs, Race drivers, Shop foremen and Final testers for White, Chandler, Ford, Willys-Overland, Chalmers, Peerless, Cadillac, Stearns and other leading factories. 15 of our June class are now truck drivers for the Government at \$100 to \$150 a month and all expenses.

We have calls for more and more men from *all parts* of the country—because our School is known to rank *highest* in careful, thorough and up-to-date training. Wonderful opportunities are developing in the Auto business right along—but you must have the *right training* by *actual experience*, and the place to get it is the



Teach



Established 1903  
Individual Instruction

Up-to-date Equipment  
13 Years of Success

## 4000 Graduates Making Good

Ours is one of the most completely equipped schools in the country; a dozen cars at the disposal of students; we teach every point worth knowing, including machine shop practice, taking apart and putting together complete cars, Knight type, 12 and 8 cyl. motors; latest starting and lighting equipment, Ambu trouble shooter, Phillips testing set, etc., etc. Just installed newest Akron-Williams tire repair equipment—same as used and sold by the leading tire companies.

### CLEVELAND LEADS

in all parts and accessory, and high grade car manufacture, and is gaining fast in new factories; Grant, Jordan, Abbott, Denmo truck, H. A. L. 12—and others building.

### TRAINING IN 4 WEEKS

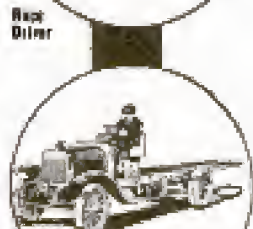
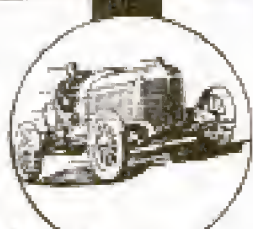
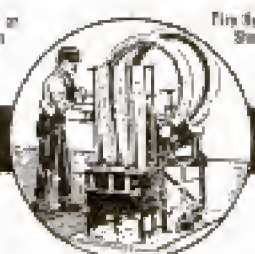
Tuition low; board and room \$5 and \$6 per week near school; congenial company and surroundings; we help you get located. New classes forming. Come and join us now.

## We Absolutely Guarantee

to qualify you for a good paying position in the Auto business on completion of our course.

## Cleveland Automobile School

CLYDE H. PRATT, President, Dept. 2, 2338 Euclid Ave., CLEVELAND, OHIO



Send This Coupon

CLEVELAND AUTO SCHOOL  
Dept. 2  
2338 Euclid Ave.  
CLEVELAND

You may send me FREE catalog, terms, etc.

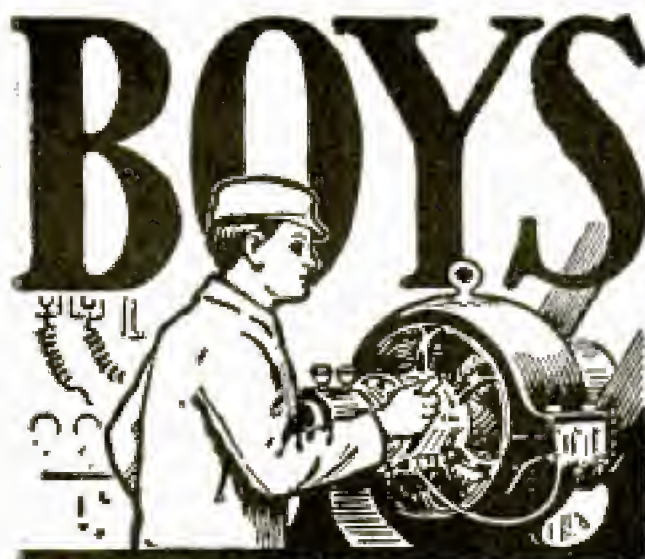
Own A Business

Name.....

Address.....

Please Mention Popular Mechanics





## Big Money in Electricity

The Electrical industries offer wonderful opportunities to boys with a liking for Electricity. The salaries paid to trained men are large, promotion comes rapidly and, best of all, the work is fascinating.

The discovery and development of new lines (such as wireless telegraphy and telephony), from time to time, promise attractive and paying fields to those who wish to specialize. The *will to do* and *Special Training* will bring success to you.

The International Correspondence Schools can help you to become an expert in electrical work, no matter what branch you like best. Thousands of young men have already won success through I. C. S. help. You can do as well as anybody, *if you try*. Everything is made so clear that you can learn in your spare time, regardless of where you live or what your work. No books to buy.

There's big money in Electricity. Get after it by marking and mailing the Coupon today. *Finding out costs you nothing.*

### INTERNATIONAL CORRESPONDENCE SCHOOLS

Box 5550, SCRANTON, PA.

Explain, without obligating me, how I can train for the position before which I mark X.

☐ ELECTRICAL ENGINEER  
Electrician  
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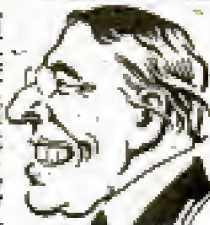
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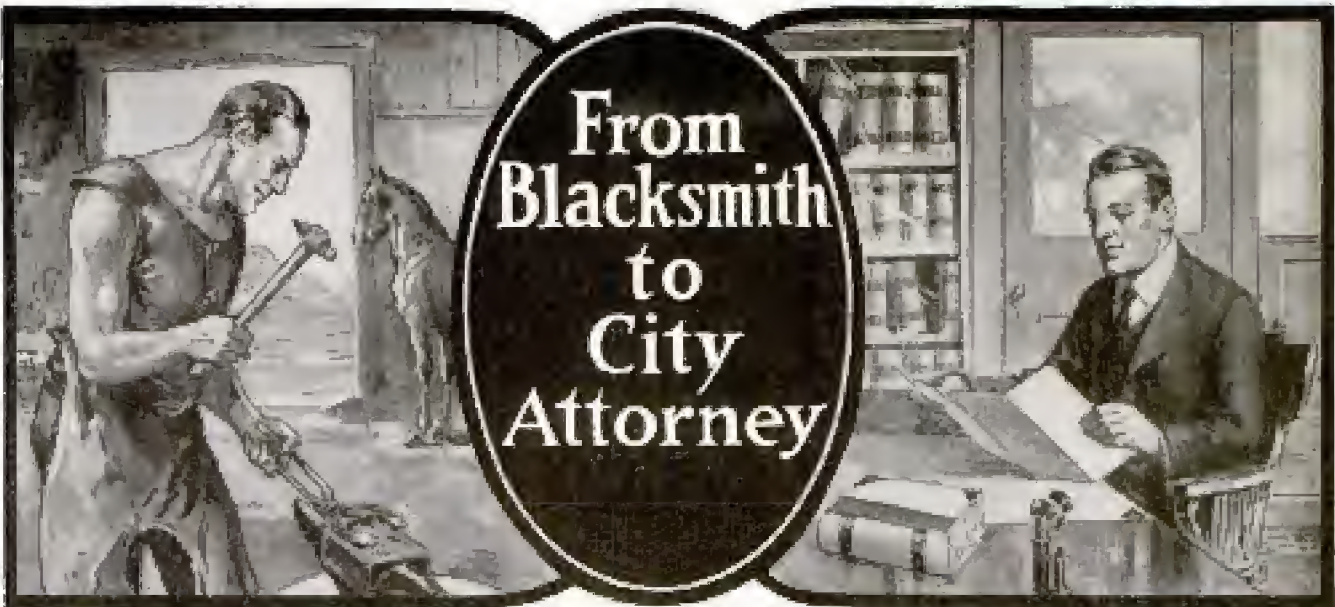
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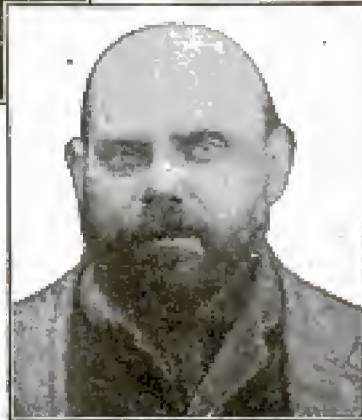
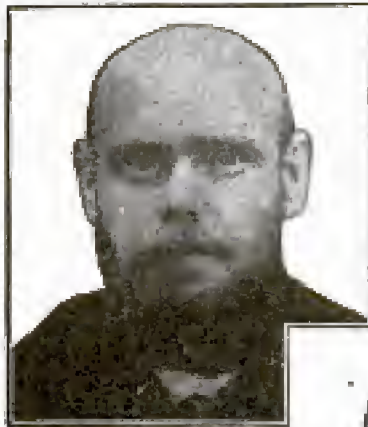
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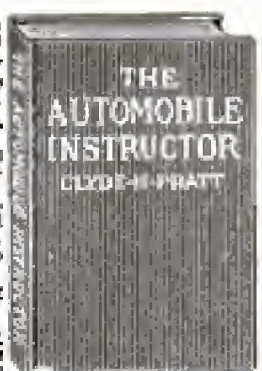
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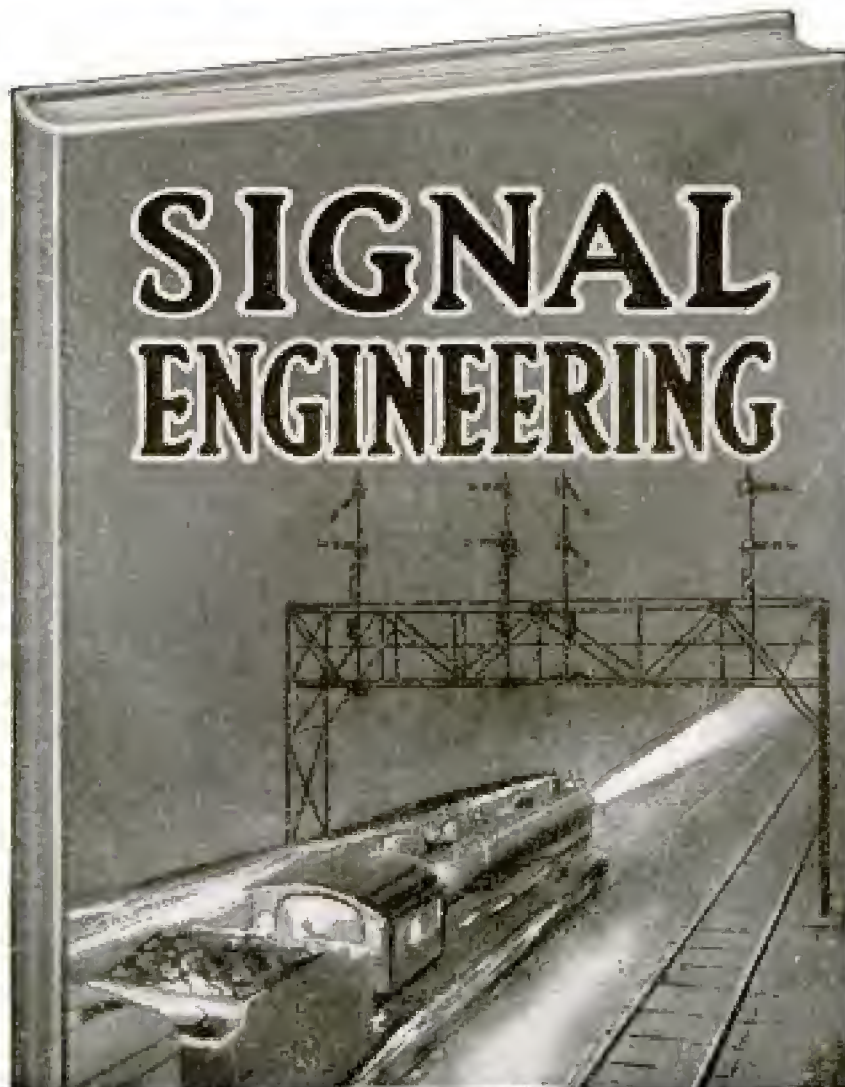
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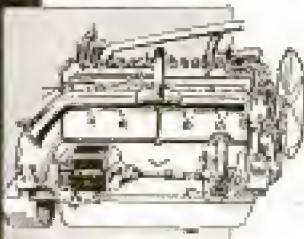
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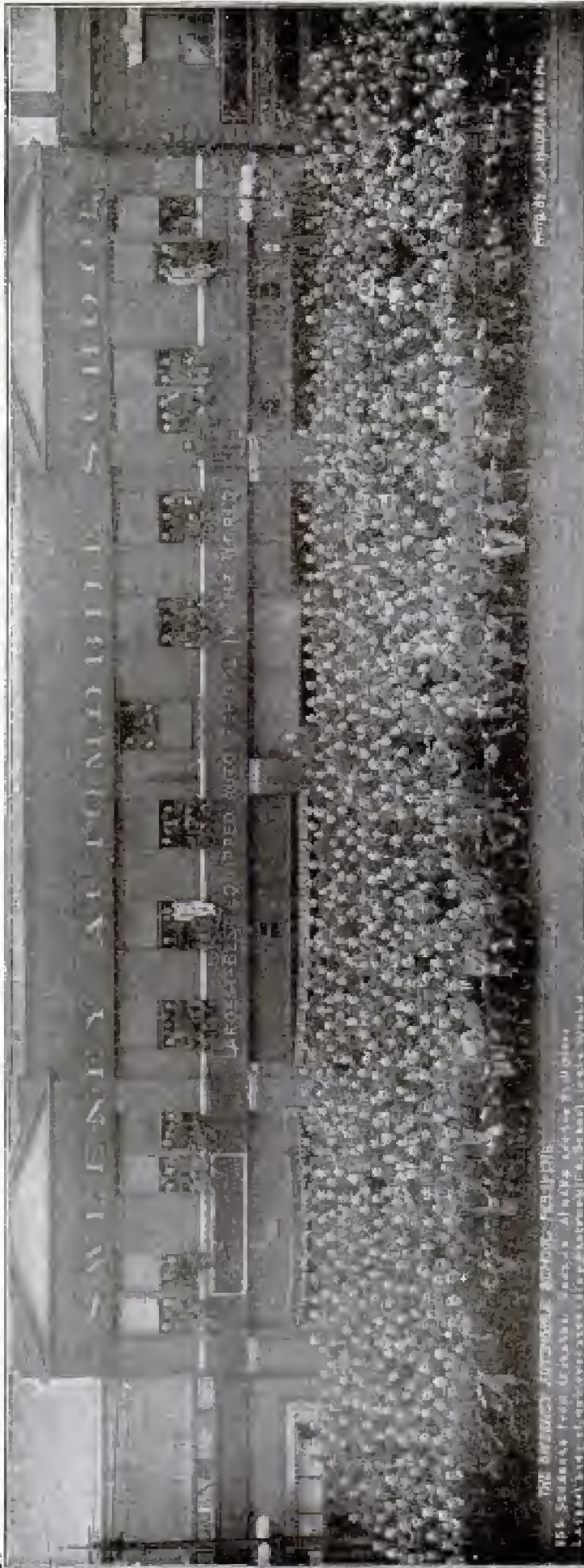
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machines, tire vulcanizing, lath work, gear cutting—in fact, I teach you to properly take care of a car and to repair it, so that you can make almost any part. If you are mechanically inclined, and if during your life you have had that longing to some day be able to fix machinery and work on it, write for my catalogue, which describes the Sweeney System of teaching the automobile business; how I put you in the shop with overalls on, make your own tools, and have a competent instructor right at your elbow to first tell you, then show you, and then you do the work yourself. This is so different from the average way of teaching in School. If you are afraid of work or grease don't come here, because when you work on automobiles you get dirty. Think of the opportunities offered you in changing your

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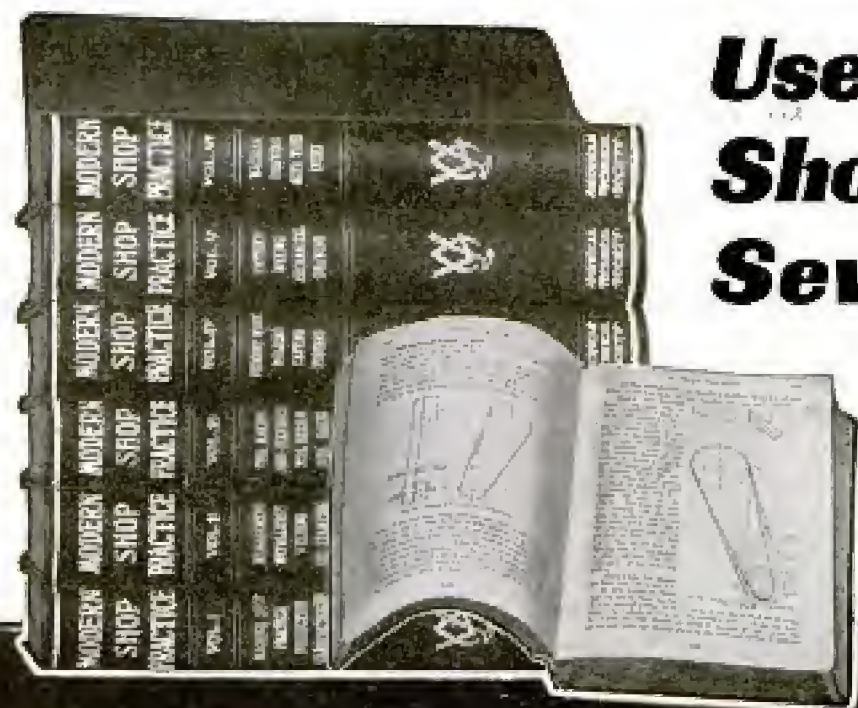
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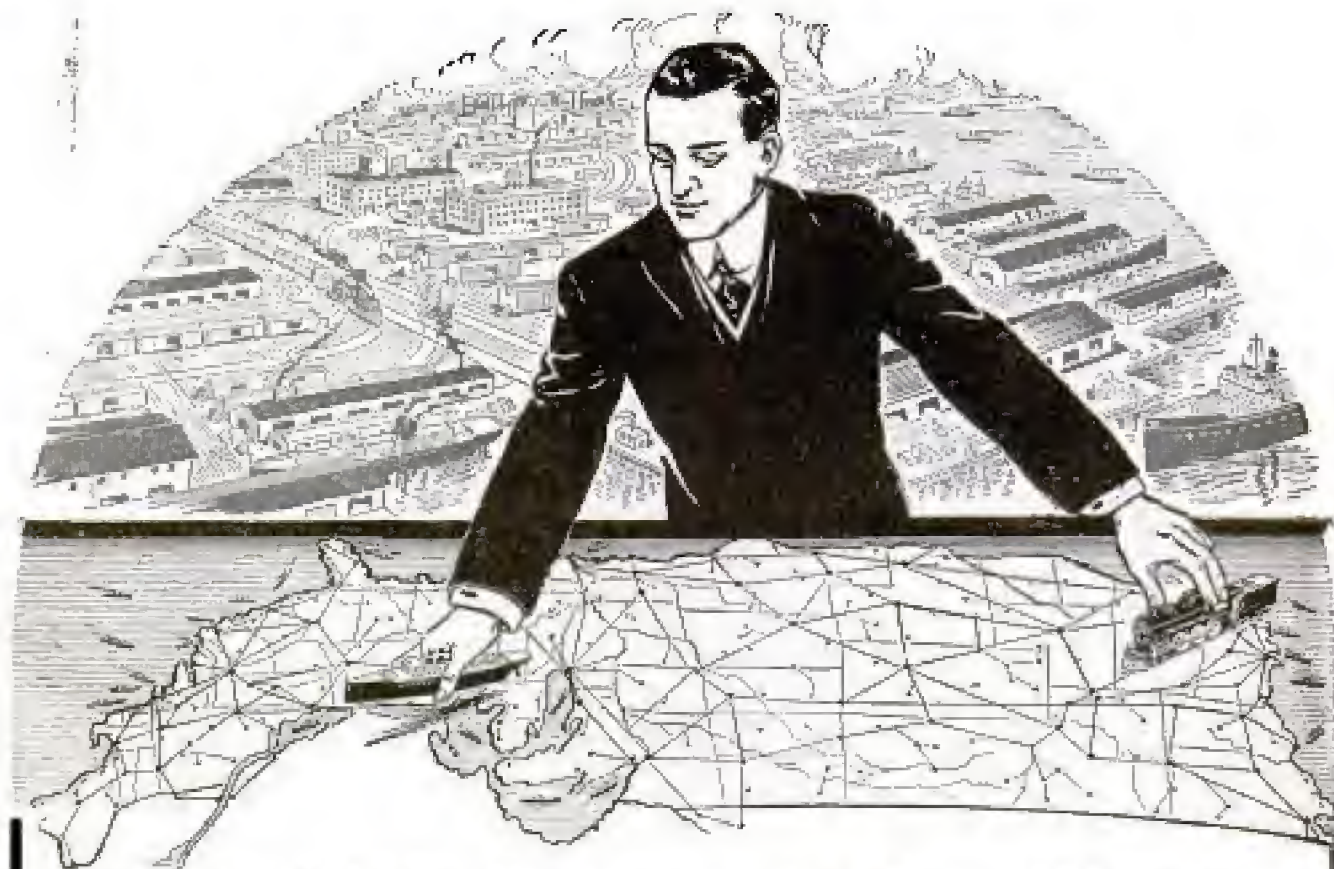
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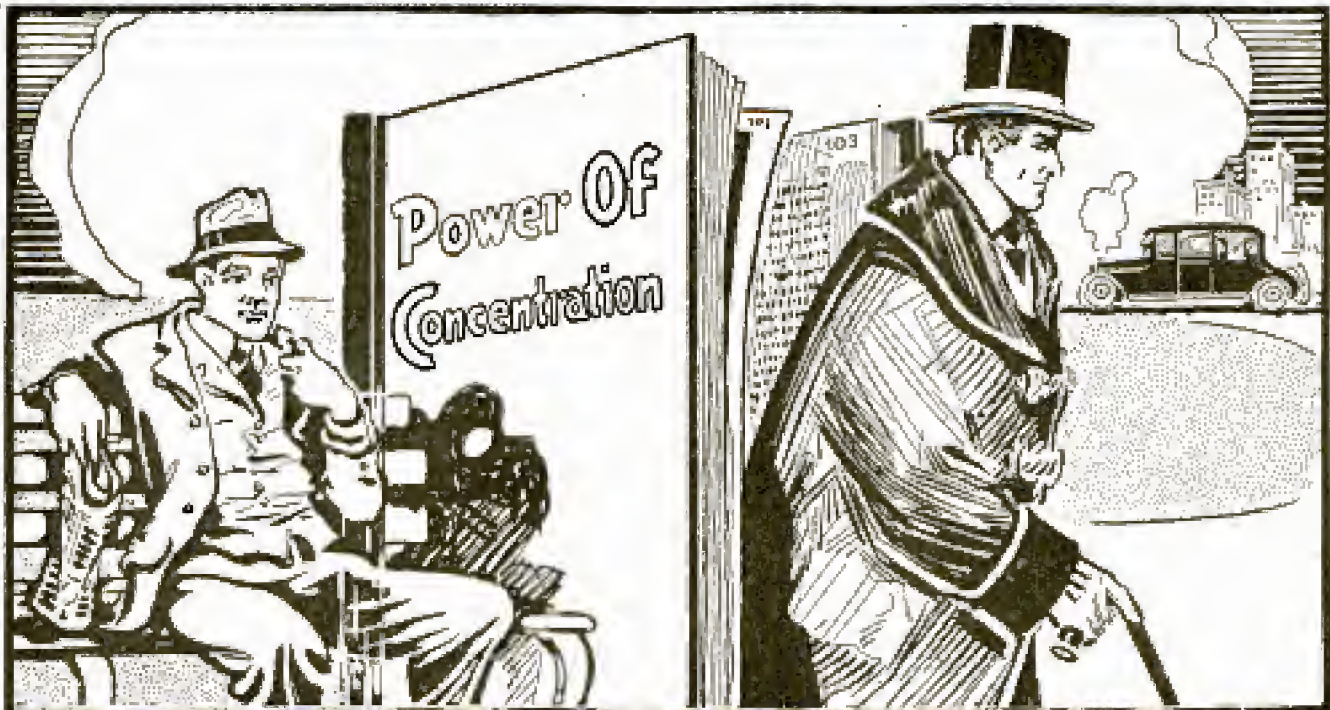
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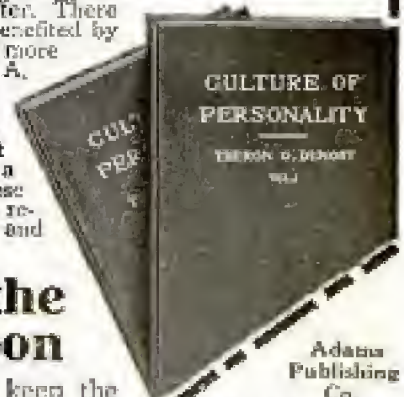
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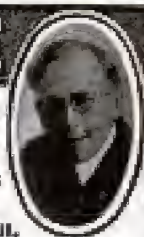
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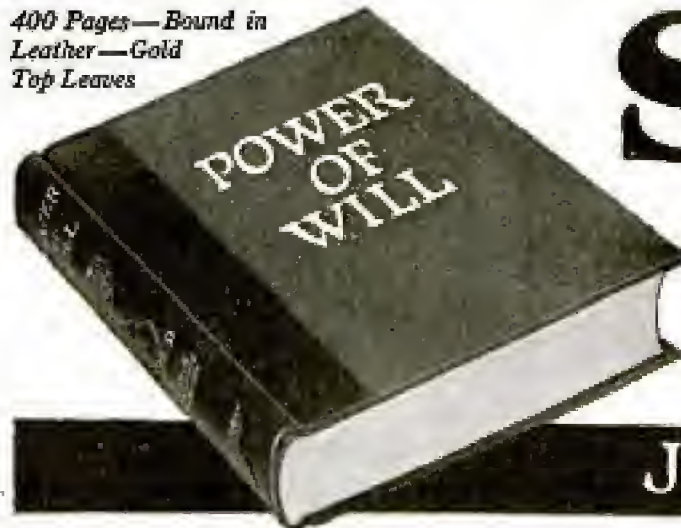
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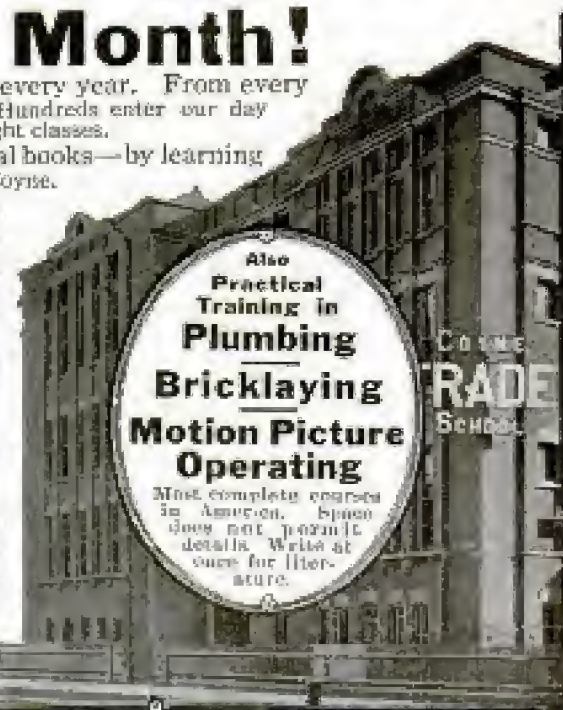
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# Popular Mechanics Magazine

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WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 27

FEBRUARY, 1917

No. 2

## Fighting Masts Hoisted onto Ships by Crane

**I**F he has ever given the matter thought at all, the average person has doubtless assumed that the big steel fighting masts, towering above the decks of our dreadnaughts, were put together piece by piece in the positions in which they stand. The contrary is the case, however. The framework is lifted into place by a crane after being fabricated. Gripped near the top, one is swung aboard a vessel and set upright almost as easily as if it were merely a light waste-basket of interlaced wire. The crane that

does this work is electrically propelled and under the control of a single operator.



Huge Electric Crane in the Shipyards at Newport News, Virginia, Setting a Big Steel Fighting Mast in Place aboard a Battleship

Newport News Ship Building & Dry Dock Co.  
Newport News, Va

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## FLASH-LIGHT ATTACHMENT FOR PHONOGRAPHS

It frequently happens that while starting a phonograph in the dark or



A Flash Light Which can be Easily Attached to the Arm of a Phonograph: It is Designed for Use in a Dark or Dimly Lighted Room

in dim light, a record is injured or the needle is so placed that the first part

of the rendition is spoiled. To overcome this difficulty and yet make it unnecessary to light the room each time a new selection is put on the phonograph, a flash light is being manufactured which can be easily attached to the tone arm of any talking machine. The bulb is inclosed in a small-metal reflector which concentrates all the rays on the disk. It is lighted merely by pressing the finger against a spring contact arm extending along the upper side of the attachment. One can operate it without difficulty while in the act of putting the needle in place, as the accompanying illustration shows. Extending along the tone arm are the electric wires which connect with a small battery. The latter is contained in a case that stands beside the revolving table. The amount of current used is so small that one battery will last a long time.

## SPELLING LESSON IS MADE

### 3485 PLEASANT PASTIME

It is a well-known truth that a child learns more quickly through the medium of play than through dull hours of tedious instruction. To make

### Miss Florence Bidelle

A teacher in one of the public schools at Columbus, Ohio, some time ago found a way of making her pupils look anxiously forward for the daily spelling lesson. Her plan of teaching is a most novel one and has proved so effective that it has been adopted by

other instructors in the elementary grades of the city's schools. A telegraph key and receiver are mounted on the teacher's desk. The children have been taught the Morse code and when a word is ticked off in dots and dashes they inscribe the characters on the blackboard and then translate them. Thus ". — . — ." means "fed" to the youngsters, who find it great fun to play telegrapher. A variation of the routine is to have different children tick out the dots and



The Youngsters Set Down the Dots and Dashes as They are Ticked Off, and Then Translate Them into Letters and Words

play of work is the endeavor of almost all really successful tutors of little tots.

dashes as words are pronounced by the teacher.



3462

## STATUE OF LIBERTY NOW ILLUMINATED AT NIGHT



THE Statue of Liberty in New York Harbor is now illuminated at night in a most impressive manner by powerful batteries of electric lights concealed behind the walls surrounding the base of the colossal figure. There are 250 lamps of 250 watts each, arranged in groups of from 4 to 28 around the statue. Reflectors add to the intensity of the illumination. President Wilson from his yacht in the harbor formally inaugurated the lighting system by pressing the key of a wireless instrument. The next instant there was a boom of guns as the warships in the harbor fired a salute. At the same time there was a flash of flame above the statue as Miss Ruth Law, the air woman, circled it in a lighted aeroplane, adding a spectacular touch to the ceremonies. Funds for the new lighting system were raised by popular subscription.

*New York World-Subscription*  
*Mr. W. C. Harris.*



3216 POPULAR NEW SEA FOOD  
HAS STRANGE HISTORY

What is virtually a fish new to the entire human race has been introduced in many parts of the country within the last few months, largely through



Specimen of Tilefish, an Edible Ocean Fish, Which was Only Recently Rediscovered: Its Brief History has been Marked by a Strange Tragedy

the efforts of the Bureau of Fisheries. It is known as the tilefish and is found in about 600 ft. of water close to the ocean's bottom, where it shelves off to greater depths. The fish averages perhaps 30 in. in length, is beautifully colored, can be caught rather easily, and has a fine flavor. Remarkable circumstances characterize its brief history. So far as is known, the first time any human being ever saw this fish was in 1879, when a captain of a fishing schooner by chance caught several thousand pounds of the strange ocean dwellers. After that discovery many other catches were made. Then in 1882, without warning, hundreds of millions of these fish, dead and dying,

were found floating on the surface of the ocean. It is reliably reported that the area covered by them was 170 miles long and 25 miles wide. It is believed that a change in the course of the Gulf Stream may have chilled the tilefish so that they were all but exterminated. For years little was heard of them. A short time ago it was found that the species had greatly multiplied. As a result of a systematic campaign to inform the American public about this strange fish, a large and profitable tilefish trade is being built up in many parts of the United States, and it is on the menus of the best hotels.

3378—  
FIVE-FOOT MODEL OF  
BLERIOT'S PLANE

A tiny reproduction of the monoplane in which Blériot made his first flight across the English Channel has been built by a resident of Philadelphia, who is of French birth. The model measures 5 ft. long, 5 ft. wide, and 2 ft. high, and weighs 8 lb. without the motor. The materials used are steel, aluminum, and silk, and cost \$225. The machine is constructed in the same manner as a large monoplane is and can be taken apart and reassembled easily. The wheels are provided with ball bearings and rubber tires. All of the parts, save the electric motor and the propeller, were made by the owner, who gave much of his spare time to the task for five years.



Two Views of a Model of the Monoplane in Which Blériot First Crossed the English Channel: The Machine Is Five Feet Long and Five Feet Wide and Weighs Eight Pounds without the Motor

Louis Gerderie  
(Builder) 2032 Chancellor St., Philadelphia



## AGED PERSONS GIVEN WORK BY GOTHAM ASSOCIATION



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These Old Men—Every One of Them a Cheerful, Willing Craftsman—Make Toys in the Association's Workshops for a Small Daily Wage

Soaring prices of foodstuffs and other necessities of life have greatly increased suffering in the slums of our big cities. Partly for this reason, partly for others, the work that is being done at New York by a philanthropic association, organized for bettering the lot of those who are needy and destitute, has come to public notice. Through the efforts of this body, old men and women are given clean, respectable work that pays them little in money but much in hope and well-being. Markets have been

opened where poverty-ridden persons can obtain provisions at the lowest possible prices, while kitchens have been established at which cooked foods are sold almost at cost. Toy making is one of the occupations opened to a large number of aged men, while sewing offers many women profitable

employment. These needy old people are not bound by strict factory rules, or expected to make slaves of themselves. They do the best work they can and as much as they are able, accepting in return a moderate wage.



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Women Who Need Employment and Otherwise would Be Idle and Possibly Destitute are Given an Opportunity to Earn with Their Needle



## DEVICE RECORDS LOCATION OF NEAR-BY SHIPS IN FOG

A device, which by means of wire-



less and sound waves will detect the presence of a neighboring vessel in a fog and record its location and course, has been constructed by a New York inventor. If the invention proves in practical experience to be capable of all that it promises, it means that the grave dangers which threaten all vessels in foggy weather

can be greatly lessened. The instrument is operated by signals sent out simultaneously from the foghorn and the wireless apparatus of a neighboring ship. Hence, to be effective, all ships would have to be equipped to give the proper warnings. The principle on which the invention is based has to do with the difference in time it takes a wireless signal to travel a given distance and a foghorn signal to travel the same distance.

The instrument consists of a flat circular case, inclosing 16 endless belts so placed that they radiate from the center. They are operated by clockwork, and mounted on each are two pens or tinting points, so placed that when a belt begins to move, the two pens travel in opposite directions. The clockwork is adjusted so that a wireless signal from another boat will start all the belts moving, carrying 16 pens toward the circumference, while the other 16 are returning toward the center. When the sound of the foghorn arrives, which is some seconds after the belts have been started by the wireless signal, one, or perhaps two, pens will dot the disk of paper which fits in the top of the instrument. The pen or pens which are actuated to make this record are only those directly in

line with the path which the sound has traveled. The dot or dots show approximately the position of the neighboring ship, while the center of the paper disk represents the position of the vessel carrying the instrument. The circular chart is marked with concentric circles, spaced according to a scale of miles based on the rate at which sound travels and the rate the belts travel. For practical purposes it is assumed that wireless signals are transmitted instantaneously.

Sixteen telephone transmitters placed along the ship's contour, each connected electrically with a corresponding belt, are the instruments which make the pens register as described above. Each receiver is so constructed that it responds only to sounds originating within a limited sector. For this reason signals from directly ahead will be recorded only by the pen traveling toward the bow, and signals from the right side, by the pens traveling in that direction, and so on. After a neighboring ship has given two or three signals, it is easy to ascertain its position, course, and the rate at which the two ships are approaching or receding from each other.

## 3457 Army COMBINATION STEEL BOWL, HELMET, AND DIGGER

A steel helmet, which can also be used as a trench digger or as a mess bowl, has been invented by a former soldier in the United States Army. It weighs less than two pounds, and yet is strong enough to furnish protection from the smaller



missiles that work so much destruction in modern warfare. The headpiece is shaped like a sugar scoop and is worn over a hat, with the pointed end at the back and the handle in front. The invention has been submitted to the ordnance board of the army.



3529 preliminary

# POWERFUL TRENCH DIGGER AT WORK IN FIELD



HEREWITH are presented two views of one of the French army's big trench-digging tractors in action somewhere along the western front, doing the work of hundreds of men. It creeps slowly ahead, cutting a ditch of the desired depth and throwing up a mound of loose earth on either side, one of which is then reinforced with sandbags and quickly made a substantial parapet. Apparatus of similar type has for years been used to dig trenches for sewers, water mains, and telephone conduits in our city streets. The point of interest lies in the way the machine has been assembled to meet the needs encountered on the battle field.



417 5th Av. NYC



(?) *Alvah H. Pulver*  
*Sodus, N. Y.*

168 3400 POPULAR MECHANICS

## CONCRETE-ROAD BUILDERS SPARE CENTURY-OLD ELM

When the builders of a concrete highway between Elmira, N. Y., and



*Cement World-Ing. 1916*  
Century-Old Elm, in the Center of a Highway: Concrete-Road Builders Decided to Widen the Pavement at This Point Rather than Cut Down the Magnificent Specimen

Mansfield, Pa., had progressed to a certain point they were confronted with a magnificent elm growing squarely in the middle of the road. An exception was made to the usual practice in such cases, and it was decided to let the tree stand. Consequently the road was widened to about double its regular width and laid either side of the beautiful specimen. Provision was made also for the growth of the roots in future years. The tree is said to be 100 years old.

3361

## MOTORISTS ARE PUZZLED BY NOVEL TRAIL

# *S. L. Patterson, Ansonia, Fla.*

As an amusement for visiting motorists a novel roadway, or trail, has been constructed at a Florida resort. It is built of lumber and palmettos, and is somewhat of the nature of a labyrinth or maze. To drive into the trail in an automobile is easy enough, but to get

out again is a puzzle for expert drivers as well as novices. There are blind passages and obstacles to block the way unless the proper course is taken, or one may find oneself driving in a circle or taking a back track without getting anywhere. The trail is the first of its kind reported in this country, but it is proving so popular that it will no doubt be speedily copied elsewhere, and in less attractive surroundings than the setting of palm trees and palmettos on the shore of the Gulf of Mexico.

2991

## CASKET CAR USED BETWEEN TROLLEY LINE AND GRAVE

A special car, which is pushed by hand, is now used in Hollywood, Calif., to transport a casket from the funeral car of a trolley line to the cemetery. The body has sides of beveled glass and somewhat resembles the body of a hearse. At the rear is a double door through which the casket is inserted and withdrawn. The running gear is chiefly of steel and the four wheels are rubber-tired. On either side of the car are three handles by which the pallbearers convey the vehicle to its destination. At the rear are two levers, one



Hand-Drawn Funeral Car Used in a Western City to Convey a Casket from a Trolley Line to the Cemetery

of which serves as a brake and the other as a means of steering the car. Flowers can be carried on the top.

*D. M. Brockway*  
*717 S. San Rocco St.*  
*Los Angeles.*



# Trapshooting as a Sport



A DEMOCRATIC PASTIME  
OF MILITARY VALUE

By JOHN ANSON FORD



**W**ITHIN recent years what has rightly been called the most democratic of sports has been gaining in popularity so rapidly that it bids fair, before long, to supersede golf, tennis, football, and even baseball in respect to the number of persons participating in it. The



An Alluring Sport—Trapshooting on the Beach: Young Folks Testing Their Alertness and the Steadiness of Their Nerves, Firing at Targets Thrown by a Hand Trap

and women of various ages, as well as boys and girls—all enthusiastic about trapshooting. They like it better than baseball or football because, for one reason, the formation of teams is not necessary to the enjoyment of the sport, although all who prefer may shoot in

teams when so inclined. This adaptability of the recreation has proven an important factor in its widespread adoption. Furthermore, trapshooting, unlike ball games and tennis, does not call for violent exertion. While golf is a milder game than these others, it must be played on a course that is more or less expensive to acquire and maintain, whereas with only a small equipment anyone can enjoy the zest of shooting clay pigeons. This outdoor recreation, now gaining such widespread favor, has already proven to be the modern substitute for the vigorous training that every pioneer in the early days received because of the dangers as well as the rigors of the wilderness—a training which really was one of the nation's chief sources of preparedness, because it developed men of skill and self-reliance. Modern life has all but deprived the average person of such training, and it has remained for trapshooting, now placed within the reach of the many by reason

A visit to one of the grand American handicap shoots, held annually in various parts of the country and attended by great throngs of people, is a revelation of the popularity which this sport is gaining among people of all walks of life. At these events one finds men

and women of various ages, as well as boys and girls—all enthusiastic about trapshooting. They like it better than baseball or football because, for one reason, the formation of teams is not necessary to the enjoyment of the sport, although all who prefer may shoot in



of inexpensive targets and cheap efficient traps, to supply the lack which so vitally affects the life of the American people and their national welfare. One trapshooting club recently displayed this significant motto in its home city: "There are 500,000 trapshooters in the United States. When occasion demands, equipped with rifles, these men will give the nation the best army of sharpshooters the world has ever seen."

A majority of those interested in trapshooting are members of some club. Ten or 12 years ago there were not more than 500 clubs in the United States, while the total today, as already stated, is approximately 4,000, and is increasing rapidly. The five states having the largest number of organizations are Pennsylvania, New York, Illinois, Ohio, and Missouri. In the first two, there are about 400 and 300 clubs respectively—more than the total for the country a decade ago. It is remarkable what a diversity of interests are represented in these clubs. Dartmouth College, Princeton, Yale, and Harvard universities were the first schools of their class to organize shooting clubs. These were followed by Columbia University, Pennsylvania State College, and Williams College. The groups in five institutions, Yale, Princeton, Cornell, Dartmouth, and Harvard, are organized into the Intercollegiate Trapshooting Association, which has greatly stimulated interest in the sport among college men. Such preparatory schools as Mercersburg, Northwestern Academy, Pawling, and Tome, each has active clubs. In quite a different sphere of activity are the members of

the organizations in the United States Navy. There are groups on the "Arkansas," "New York," "Florida," "South Carolina," "Texas," "Wyoming," "Oklahoma," "Cheyenne," and "Glacier." These marksmen held a most interesting tournament last spring in Guantanamo Bay, Cuba, while the Atlantic fleet was at the proving grounds there.

The northernmost of all the clubs under the American flag is at Nome, Alaska. That body frequently holds its shoots on—or in—five feet of snow and has the further distinction of conducting its contests at midnight, although not by artificial light, for the midnight sun supplies the illumination. The popularity of the sport in country towns and small cities is well illustrated by the success of the club organized a few months ago in Wausau, Wis. This group started with a few shooters who depended on a hand trap to throw their targets. Today it has 125 members, owns a fine clubhouse, and is rated one of the strongest organizations in the Middle West. The municipal authorities of

Sedgwick, Colo., did an unusual thing last year by hiring a professional trapshooter to give exhibitions every Saturday afternoon and so stimulate interest in the sport. The employees in the hardware stores in Sioux Falls, S. D., have formed a club and conduct shoots every week, in season. Farmers in many parts of the country are taking up trapshooting, and many shotguns, that have long hung over the door undisturbed because of the increasing stringency of the game laws, are being used once more.

Outside the membership of the hun-



COPYRIGHT, BOSTON PHOTO NEWS COMPANY  
Unusual Trapshooting Tower Owned by a New England Club; Targets are Released from the Top, the Gunners Standing on the Platforms





View Taken at a Grand American Handicap, Which Is the Great Annual Event in the Trapshooting World. Picked Shooters from Leagues in Many Parts of the Country Share in the Invigorating Outdoor Tests of Skill. The Squads of Marksmen are Shown at the Edge of the Open Area, Facing the Low-Lying Trap Houses at the Left of the Picture

dreds of clubs there are many families and small informal groups that enjoy this sport. Besides a gun, shells, and targets, a hand trap, which costs only about \$4, is all the equipment required. The hand trap has done perhaps as much as any one thing to bring the sport within the reach of the many. It is a comparatively simple spring-operated mechanism held in both hands somewhat as one holds a gun. After it has been set and loaded with one of the saucer-shaped clay pigeons, it is discharged by pulling a trigger and will throw the targets in a great number of ways. Even a boy or girl, with training, can operate the trap so as to call forth all the skill of a veteran shooter. The device is employed in a great variety of places. With it targets can be thrown from the deck of a launch while members of the launch party on board try their skill with their guns. Hunting parties often resort to trapshooting when game is scarce, and often picnickers who prefer targetshooting to killing live creatures, find it a splendid pastime. Many a city dweller has found himself too far from the forest or prairie to learn to hunt, or if he has been skilled in the past, he has been unable to keep in practice. To such persons trapshooting is a great

boon. A short trolley ride will usually bring them to a bit of open country where keenness of sight, quickness of thought, and steadiness of nerve can all be brought into play in an exhilarating hour of targetshooting.

Persons of distinction and wealth, no less than the great mass of the common people, are enthusiastic about this sport. King George of England and King Alfonso of Spain are expert trapshooters, and the same is true of many prominent men in this country. On the other hand, boys and girls have won distinction in this field of recreation. Master Bruce Steele, of Birmingham, Mich., when only 12 years old, broke 94 out of 100 targets—a record which perhaps even the royal trapshooters cannot equal. Miss Lucille Meusel, of Green Bay, Wis., when in her fifteenth year, made "straight runs" of 17 and 19 shots and could hit 23 out of 25 targets. She was taught to shoot by her father. Because they both loved the sport, a fine comradeship sprang up between them, and it has not been uncommon for this girl and her father to spend an afternoon together in the open, trapshooting. Another proof of the universal appeal of this pastime is that even crippled persons can engage in it. In the accompanying



illustrations are pictures of two men, each deprived of one arm, who are expert trapshooters.

The history of many trapshooting clubs, large and small, shows that it is a comparatively easy matter to start an organization of this character. A group of two or three interested persons can obtain, free, trapshooting literature which is issued in great variety by powder companies, for distribution among prospective members. The pamphlets explain the advantages of the sport and also outline each step in building up an organization, from the calling of the first meeting to the management of league shoots. Where practical, some companies will sometimes send, without charge, an expert to assist the amateurs in making the right start. In selecting a site for club grounds a location should be chosen which is easily accessible, and it should have no dwellings or outbuildings within 250



These Adjacent Pictures Are Photographs of Two Crippled Men, Both of Whom Are Expert Trapshooters



It Is Interesting to Note That One Shooter has Lost His Right Arm; the Other, the Left

or 300 yards of the firing line. If possible the grounds should be laid out so that the marksmen face the northeast, toward a clear background.

It is surprising what a small outlay is necessary to start and equip a club. If the members wish to be very economical, they can get along with a shelter costing only a few dollars, while for \$100 they can erect a plain but very satisfactory clubhouse. Working plans of such a structure, as well as of far more costly ones, can be obtained free from one of the powder companies. The principal item of equipment in addition to the shotguns and the targets, which cost about \$5 per thousand, is the trap. This may be a hand trap, already described; a portable trap, operated by a cord and costing \$6.50, or a so-called automatic trap. The latter is always housed in a low, heavy-walled shelter, called the trap house, with an open side which faces away



Even Old Men Are Enthusiastic About Trapshooting: This Marksmen Is a Confederate Veteran Living in Oskaloosa, Iowa



A Sport from Which None are Barred: A Middle-Aged Mother can Learn to Shoot, as This Picture Bears Witness, as Well as Her Husband and Children



A Shooter in His Teens Who in a Recent Handicap Proved a Better Marksman Than Many of His Elders





Trapshooting Appeals Alike on Land and on Water: The Simple Device Which Makes Possible the Enjoyment of the Sport in Such a Variety of Circumstances Is the Hand Trap, Which is Shown Here About to be Discharged by the Boy at the Left. The Rise and Fall of the Boat Only Adds to the Zest of the Contest

from the firing stations. A helper, called the "trapper," sits in the shelter of the trap house and loads the machine with clay targets. A man, or boy, known as the "puller," is stationed a few feet behind the firing line and operates a lever which is connected with the trap by means of a rod or wire. The machine is set and re-

leased by the puller, according to the signal of the man about to fire. These automatic traps are made in different styles. One costs \$35 to \$40, while another rents for \$30, for the first year, and \$10 for each succeeding year, with a \$15 refund on the return of the trap. The firing stations at which the marksmen stand are usually five in number



Watching Others in the Squad While She Waits Her Turn: The Gun is being Held in the Proper Way to Avoid Accident



A Familiar Figure at Many Shoots: This Man, Though Deprived of Both Limbs, Is an Expert Referee, His Low Position Giving Him an Advantage in Judging Targets



Miss Lucille Messel, the Youngest Shooter in the 1916 Grand American Handicap: At 15 She could Hit 23 Out of 25 Targets



and are placed from three to five yards apart on the arc of a circle, the center of which is 16 yards from the stations. The traveling limit of the targets is about 50 yards.

From the foregoing figures it can readily be understood how some clubs have started up with an expenditure as low as \$15 or \$20, where only a hand trap has been used, and that for \$150 other organizations have provided themselves with a neat clubhouse, an automatic trap, and a few accessories. The membership fee in most clubs is \$2 per year. In addition to the purchase of a gun, the cost of which will be from \$20 up, according to the individual taste, each member must pay for the shells he uses and the targets he shoots at. The charge usually made for the latter is from three-fourths of a cent to one cent each, thereby allowing the club to make a small profit. A box of 25 of the less expensive shells sells for about 75 cents.

The grand American trapshooting handicap, held last year in St. Louis, gathered together from the four cor-

ners of the country the best shooters of the various leagues which constitute the national association—a splendid company whose favorite pastime in the outdoors had given them marvelous self-control and alertness. The gathering was inspiring proof of what this most democratic of sports can do for people of all walks of life and was an indication of the great hold that it is to gain in the coming years, resulting in the betterment of thousands of individuals and in making the nation as a whole better prepared to meet the future. For the first time women amateurs contested, 10 shooting in the big events. In the week's scatter-gun tournament, 618 men, women, boys, and girls participated. The winner of the premier event of the meet was a veteran trapshooter who declared that he had been training for that victory for the past 17 years. A splendid thing about trapshooting is that the fine development which those years of recreation had given him differs only in degree from that being acquired by every person who shares in the sport.

3113

### REMINDERS OF CALIFORNIA WHEAT-GROWING DAYS

A strange-appearing reminder of the days when California was one of the great wheat-producing centers of the

world is to be found in the rotting piles that line the shore of upper San Francisco Bay. It was here that wheat, carried by trains and barges from the extensive fields of the interior, was graded and stored before being loaded

onto the clippers that crowded the bay, waiting to transport the grain to the markets of the world. Some of the warehouses were three-quarters of a mile long. When at length wheat-growing became unprofitable, the buildings fell into disuse and many of them were pulled down and others burned. Today their sites are marked by the charred and rotting piles that project in long rows above the water.



These Piles Are Practically All That is Left of the Great Wheat Elevators That Housed Much of California's Wheat Crop in Other Days

# Oscar Lewis,  
2337 Alcañiz, Av.,  
Berkeley, Calif.



Harry Bloch, Engineer Bureau of Buildings,  
464 Lexington Av., Portland, Oregon, 175

3350 POPULAR MECHANICS

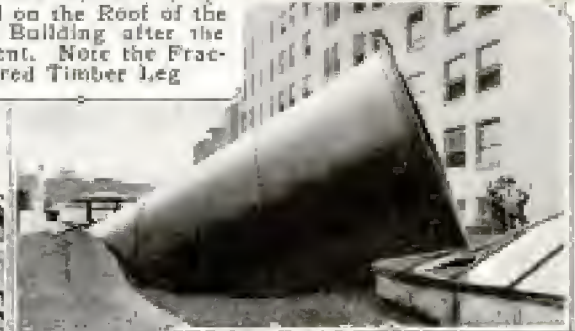
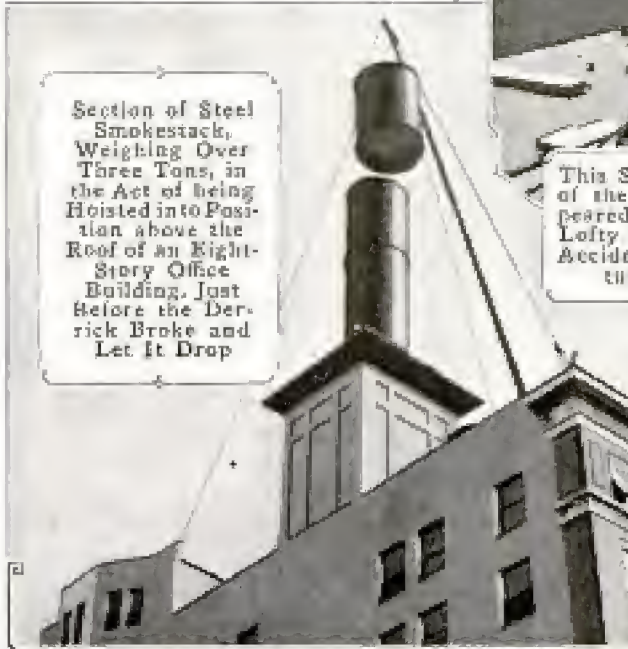
## BIG CHIMNEY STACK FALLS AS DERRICK FAILS

Through the breaking of a derrick on top of an eight-story office building in Portland, Ore., a section of steel boiler stack, weighing 6,700 lb., which was being hoisted to place above the roof, was



This Shows the Wreckage of the Derrick as It Appeared on the Roof of the Loft Building after the Accident. Note the Fractured Timber Leg

Section of Steel Smokestack, Weighing Over Three Tons, in the Act of being Hoisted into Position above the Roof of an Eight-Story Office Building. Just Before the Derrick Broke and Let It Drop



Here the Fallen Section of Stack is Seen Where It Fell: It Crashed through the Roof of a Two-Story Building, but Its Fall was Halted by a Concrete Floor

dropped 145 ft. to the temporary wooden roof of a two-story annex below. It crashed through this roof to a concrete floor on the second story, but was there stopped, apparently without damage to the concrete slab. The stack was flattened and had to be returned to the shop. When the accident occurred, the last of three new sections was being added to the chimney of the building in an effort to prevent smokiness. The section of stack was 15 ft. long and 10 ft. 6 in. in diameter. The derrick in use had an A-frame composed of 14 by 14-in. timbers of Douglas fir, with a vertical height of 45 ft. and a spread of 50 ft. It had no stiff legs, but was guyed to the roof with two sets of steel cables, anchored to concrete girders. The boom was a single stick of Douglas fir, 106 ft. long, working on a vertical pin  $4\frac{1}{8}$  in. in diameter. Its weight with fittings was about 6,600 lb. The failure came through one leg of the A-frame twist-

ing or tearing off just below the top connection. The boom fell in a vertical line, struck on a fire wall, and broke off a few feet outside. The steel stack section struck the wooden roof below with its nearer side about 40 ft. from the wall. Inspection after the accident showed that the timber of the derrick was not entirely sound, but no real decay was visible. It was seriously weakened by bolt holes.

3466

### LOCAL PAPER PRINTED ON RED-CEDAR SHINGLES

A special edition of 50,000 copies of a local paper, published in Castle Rock, Wash., was issued recently printed on red-cedar shingles. Castle Rock is in the heart of an extensive shingle-producing country and the present low price of shingles, together with the high price of paper, inspired the publisher to issue this novel edition. It is devoted chiefly to a discussion of the

Cowlitz County Advocate,  
Castle Rock,  
Copyrighted material  
Wash.



lumber exports and imports of the country under the present tariff and was widely distributed. At the time



Copy of a Special Edition of a Castle Rock, Washington, Paper Printed on Red-Cedar Shingles as Protest against the High Price of Paper and the Effect of the Tariff on the Lumber Market

the "paper" was printed, shingles could be bought wholesale at the rate of about six for a cent.

3346

### OPEN-FRONT AUTO GOGGLES PROTECT EYES FROM WIND

Automobile goggles which are entirely open directly in front of the eyes and yet afford ample protection against the wind, have been patented by a young man in South Bend, Ind. A wall of celluloid which projects for-



Goggles Which Are Open Directly in Front of the Eyes but Which Have a Projecting Wall of Celluloid That Protects Them Entirely from the Wind

Roy N. Dickey  
(City Electrician)

111-City Hall Bldg., South Bend, Ind.  
Inv.-Company organized

ward from the face surrounds the eyes and is attached to a leather frame that fits snugly against the forehead and cheeks. This arrangement forms pockets in which the air is practically motionless and as one faces the wind these air cushions protect the eyes so that they scarcely feel the draft at all.

3102

### NEW SIBERIAN PORT TO

#### AID RUSSIA IN WAR

*Far Eastern Review—Aug. 1916*

Russia has recently opened a new Pacific terminus for its great trans-Siberian railway and thereby hopes to relieve the congestion of shipping which has overwhelmed Vladivostok since the war began. The new port is Nikolaievsk on the Gulf of Tartary, at the mouth of the great Amur River, and about 850 miles north of Vladivostok. Freight received at the new terminus will be sent up the river for some distance and then transferred to a branch railway which connects with the transcontinental line. The immense task of double-tracking the trans-Siberian railway was begun several years ago, but when the war broke out large additional forces were put to work to complete that undertaking. Now that the double-tracking is finished and the new port is open, it is expected that the volume of supplies which will be shipped from Japan and the United States to the Russian fronts will be greatly increased. Until now the wharves and warehouses have been piled high with goods, which Vladivostok could not handle fast enough.

### MINIATURE-TRAIN SERVICE

#### 3174 FOR CITY PARKS

The miniature auto-drawn trains, which attracted so much attention at the San Francisco exposition in 1915, are being introduced in various city parks and have proven not only a source of entertainment but of convenience as well. Train service of this character was inaugurated in Lincoln Park, Chicago, last summer. Each train consists of a very small but strong automobile and several low cars.

Fadgh Auto Trains, Inc.  
R-768 122 S Mich. Av.,

Copyrighted material  
Chicago





A New Variety of Miniature Auto Train Which has Proven a Source of Much Amusement for the Children of Oakland, California.

Most of the cars have long seats placed back to back so that the occupants face either side. A novel variation of this type of conveyance is called an "animal train." Mounted on the car floors are several small wooden donkeys, saddled and bridled. In addition there are cushioned seats at either end. One of these trains is in operation in Oakland, Calif., and has been a source of great delight for many youthful patrons.

### RUNNING GEAR USED TO MAKE BRIDGE ON RANCH

The running gear of a wagon serves as the principal feature of an unusual portable bridge employed by a rancher near Buffalo, Wyo., in getting his sheep across streams. The front and back pairs of wheels are separated from each other after they have been drawn to the point where they are to

be utilized. One pair is placed in the stream near one bank and the other pair near the opposite bank. The gap between the two is spanned with logs, and approaches of similar material are provided. A number of sheep dogs assist in rounding up the flock, while men near the approach to the bridge encourage and urge the animals along. This ingenious arrangement is used by the rancher in getting thousands of sheep across streams, and saves the cost of building structures which might be washed away.



A Strikingly Beautiful Scene on a Ranch near Buffalo, Wyoming. Showing a Portable Bridge Made with Wagon Running Gear and Logs and Used in Getting Thousands of Sheep across Streams



## HOT-WATER BATHS IN SANDS AT BORDER FOR SOLDIERS

Some of the crude but ingenious bathing facilities devised by soldiers in



The Water-Heating Plant Consists of a Brick Furnace with an Iron Tank Placed Horizontally on Top of It



When Completed, the Furnace and Boiler are Covered with a Heavy Blanket of Mud so That the Heat is Retained

the European trenches have been seen among the war photographs from time to time. But it remained for our own boys on the Texas frontier to emulate the comforts of the home to the extent of providing hot water for their toilet. The Eighth Regiment of the Pennsylvania infantry equipped itself with bath-houses and then installed water-heating plants adjacent to them. One of these consisted of a brick furnace with a cylindrical boiler on top connected with coils, made of

ordinary iron pipe, supported in the fire box. Cocks were provided in the system so that the pipes could be thoroughly drained at night to prevent them from bursting at times when the temperature dropped below the freezing point. The heating plant—furnace, boiler, and all—was heavily covered with mud.

3051

## PLAYER-PIANO MUSIC MADE WITH SMALL MACHINE

See P. M. M.

Designed especially for the use of retail dealers, a compact machine that perforates music rolls for use in player pianos is being introduced. The apparatus is capable of making from one to 16 records at a time from sheet music, and will also turn out copies of any standard roll. Its operation is said to be so simple that satisfactory work can be done by persons who are not musicians. The particular advantage of the machine seems to be that it enables a small dealer to fill his customers' orders promptly without having to carry a large, expensive stock. It also obviates the inconveniences that confront patrons when special orders have to be mailed to a factory before their wants can be supplied. Since 16 sheets can be perforated simultaneously, a dealer in making a roll to order has an opportunity to add 16 records to his stock with no expense other than the bare cost of the paper and spools.



Sixteen Rolls of Player-Piano Music can be Perforated on This Machine at One Time. The Device is Intended for Either Small Dealers or Piano Users

ⒸThe authorities of Los Angeles have been asked by certain exporters to establish a municipal ocean-steamship line. The city's charter permits such undertakings.

*Received  
2423  
Nov 23  
at 16  
L. C. Hamilton  
Mts. Co., Section 14.*



# Sailors' Sensations in Battle

by Lewis R. Freeman  
287 E. Calif. St. - Pasadena



## Being Torpedoed

I HAVE talked in the last few months with many men who have been aboard one kind of craft or another when it was torpedoed—trawlers, cruisers, and ocean liners—but no one of them has been able to give so comprehensive, so illuminative an account of what the experience was like—of what happened to himself, the ship, and to those on board the ship—as Capt. Rupert S. Gwatkin-Williams, the officer who was in command of the converted Irish Channel packet "Tara," when she was sunk by a German submarine in the Mediterranean at the end of 1915. Through the courtesy of the British Admiralty, I interviewed Captain Gwatkin-Williams while he was in London, waiting to proceed to his new command, and the account of the torpedoing of his ship which follows is from his personal diary, written while he was a prisoner of the *Senussi*, to whom he and his men were handed over by the commander of the German submarine.

"It was a fine morning, and I was on deck looking for Sollum, which we were approaching. Suddenly the lookout in the crow's nest gave a hail and

pointed. Looking over the starboard rail I saw a torpedo, about 300 yards away, leaping toward us. Habit made me look at my wrist watch. It was 10:10 a. m. The torpedo fascinated me for a moment. In that marvelously clear water I could note its every detail. The fishlike body showed bright vermilion in the sunlight, with black square patches on top where the balance chamber was. It seemed to travel along in ever-quickenings spurts, and as it got closer and closer I could see the detonating apparatus of striker and 'whiskers' in its nose, and the various valves and levers for adjusting and starting the engines.

"I realized at once that we were a 'goner,' our speed being too slow to dodge. Nothing but the unlikely event of the torpedo failing to explode could save the ship. On rushed the torpedo. The ship was just beginning to gather weigh, when she was struck on the starboard side, fair against the engine room. A dull, mumbly, cracking roar, and a great black column rose as high as the main lower masthead. I suppose that it was formed of water, smoke, coal, and debris, but it was impossible to say. Only its blackness impressed me. A



great yawning hole in the side, the deck blown away, and the aerial of the wireless destroyed—this was the result."

Captain Gwatkin-Williams goes on to tell how a well-aimed shot from his gun on the forward deck forced the submarine, which in the meantime had come to the surface a mile astern, to withdraw its periscope. "We at least had the satisfaction of knowing that the submarine was blind for the time being, and could not torpedo us again without putting up its 'eye.' But it was a poor satisfaction after all. The old ship had steamed her last mile. No answer came from a call down the engine-room voice pipe to order the engineers to come on deck. Only a confused gurgling sound bubbled up the tube. All in the engine room were dead, having been overwhelmed by the explosion and the rush of water. No human hands ever stopped those engines. They were still turning when she made her last great plunge, 100 fathoms deep, into the Mediterranean.

"The ship settled down steadily on an even keel. Suddenly, without any warning, her bow shot up in the air at a sharp angle, and a great wave seemed to rush at us from aft. It was like the bursting of a milldam, and on its foaming crest it bore boats, spars, meat safes, and broken wreckage of all descriptions. This was rather an uncomfortable moment, being unexpected, and I couldn't think what was the most sensible thing to do. However, matters were soon settled for me. Before the avalanche and its battering ram of tossing debris I fled, and was washed down the ladder onto the fo'c'sle, from which vantage point I quickly took a dive overboard. Going overboard into that calm sea looked simple and easy, but I found to my disgust that I was instantly sucked back again, this time with the ship under water, and my head against the very awkward problem of the fo'c'sle awning.

"As she went down, amongst the churning bubbles, I could see the daylight getting farther and farther off. I

had my clothes and boots on. I think if I had been wearing my life belt I would have been drowned. But my life-saving collar was safe in my pocket, uninflated, and, being heavy, I managed to struggle and dive a little deeper and get clear of that all-embracing awning.

"Up, up I went, the gay sunshine getting nearer and nearer once more, till I seemed to feel its warmth. The bubbles raced past me and reminded me of pictures I had seen as a child, depicting people going to heaven, with the silver stars all around in a blue firmament, and a great light above. Up, and the pressure on my lungs got less, till, with a great gasp, I found myself on the surface, shot halfway out of the water, practically none the worse.

"Signs of the ship there were none, only a great heaving and churning of the water, broken every moment by spars and other light objects, disentangled from the sunken ship, hurtling into the air from the depths.

"I swam to the nearest life raft, and from there clambered onto the bottom of an upturned boat. Here I could stand up and survey the desolation. The whole surface was covered with brown oil, as well as with wreckage and swimming figures. Some who were injured were calling out for help, and close by was the body of the cook, floating in his life belt."

Heavy as was the explosion and comparatively small the ship—she was under 4,000 tons—in the case of the blowing up of the "Tara," Captain Williams assured me that the shock of the explosion where he stood—about a hundred feet away—was by no means great; that, had he not seen the torpedo, he might well have thought the ship had touched bottom or run down a smaller boat. "The shock itself," he said, "was not so very different from that which runs through a ship under the impact of a breaking head sea, and I have lurched more unsteadily on my feet from the jolt of a ferryboat entering a slip."

In an explosion of this kind one's



proximity to it has, of course, a great deal to do with the shock, both physical and mental, experienced. To the stricken engineers of the "Tara," none of whom survived to tell what he felt, the explosion must have been little short of primal chaos. Even the wireless operator, whose cabin was wrecked by the torpedo and who was rescued in only the shirt of his pajamas, told me that it was as if the whole ocean had gathered itself into a single huge jet and started to rush up through the ship. "One end of my cabin—I was in bed at the time—was torn right off," he said, "and I was thrown out on the buckled-up floor. Luckily, the door was jammed open, and I had just room to squeeze through into the companionway and make for the saloon."

These two instances cover so completely the experiences of the several dozen survivors of torpedoed ships with whom I have talked that, beyond personal injuries and impressions, there is nothing more that could be added.

#### Being Mined

The effect of a mine on a ship is usually very similar to that of a torpedo striking in the same place. As a mine's contact is almost invariably in the shape of a "clean hit" on one of the bows, the injury is more often "true to type" than that of a torpedo, which may hit anywhere from forefoot to rudder. It is the similarity of the action of a mine and a torpedo which

may give rise to so much uncertainty in the event that the injury is to the forward part of the ship. The finding of a fragment of torpedo in the wreckage is all that has definitely established the cause of the injury in a number of notable cases.

It may be a coincidence, but of men I have talked with, a larger proportion from mined than from torpedoed ships have mentioned the great shock of the explosion.

This, however, might be explained by the fact that a properly aimed torpedo strikes more or less amidships, and has more of a chance to expend itself upward in the comparatively open spaces of the engine rooms than in the confined forward bulkheads where the force of a mine is exerted. The "kick" of a mine, too, being more often in the opposite direction to which the ship is traveling, is calculated to produce more of a jar than the broadside "knock" of a torpedo.

For the rest, the experiences and sensations of the man on the mined passenger steamer or warship are not different from those met with in a similar mishap from a torpedo.

#### State of Mind in a Naval Action

The question of what a man is most likely to think about when under fire, or in action, has been much discussed since the battle of Horn Reef. Much evidence has been collected and many theories advanced. Obviously, the answer will depend very much upon the man, what sort of fire he is under, and—especially—what his duties are. Generalizing very broadly from conversations I have had with, and letters I have read from, men who went



"Up, up I went. . . . The bubbles raced past me and reminded me of pictures I had seen as a child, depicting people going to heaven, with the silver stars all around in a blue firmament, and a great light above."



through this greatest of naval battles, I should say that, so far as the British sailor is concerned, the concentration of mind in carrying out in action the duties which he had trained so assiduously for during many years of peace, pretty effectually kept his thoughts from wandering far afield. The following extract from the letter of an officer whose ship gave and took some of the hardest knocks, seems to me to indicate a state of mind fairly typical of the average British sailor in action.

"I suppose I was too busy to think. We just got on with the work and that kept us stretched. When we got a German cruiser, I said 'Our bird,' and I have an idea we passed a word or two when a shell gave our turret a rap that made our teeth grind; but as for 'happy memories of boyhood days' and 'The Little Gray Home in the West'—nothing doing. You've got to keep your mind on one thing, and that isn't 'memories of home,' but your work. If a sailor tells how, with shells exploding and men being killed around him, he was thinking of a girl at home, don't believe him, especially if he is telling it to the girl. One does a bit of thinking on the way home after the battle, and that's when the sailor gets soft and imaginative.

"In some ways you do not even think about the fighting, at least not to call it thinking. You think about what you're doing, and you've a hot sort of interest in the way the fight's running, though that doesn't do you much good, because you know no more than you can see, and you can't see much of anything but smoke and fumes and splashes. There are things, of course, that get fixed in your mind—like when you see a ship go suddenly—and later on these things come out so clearly that you know you will never forget them as long as you live. It may be you've got it a little wrong (that's what leads to argument when men remember differently), but your own impression sticks and you would swear by it. My impression of action? I can't say much except that we were steaming fast, firing fast, and that

there were more shells flying about than I care to think about now. I remember somebody picking up three or four severed legs and throwing them overboard, and thinking that it was the sensible thing to do. I saw bodies in the sea, too. The rest is chiefly smoke and noise."

An officer who recently showed me over a superdreadnaught that had been in action during a part of the Horn Reef battle, said that he had only the vaguest recollections of what went on about him during this time. "This very one of my two 'babies,'" he said, patting affectionately the massive breech of the 15-in. gun he had been explaining to me, "accounted for at least one German destroyer, but I was so much engrossed in keeping them 'talking' that I had no eyes or ears for anything else. The noise must have been something stupendous, but I have no distinct memory of its impressing me. My principal recollections are of how hot it got in the turret after we had fired a few rounds, and how deucedly uncomfortable it was that night—we 'stood by,' hoping to get another crack at the Germans, for the next twenty-four hours—trying to snatch a nap curled on that steel grating."

An officer of a British cruiser which had stood perhaps the heaviest fire of any of the ships not sunk, told me of an interesting incident. "We were under the concentrated fire of two or three German battleships at the same time," he said, "and the detonations of their shells, striking the water and exploding, came to us, even 'tween decks, like the roar of our own secondary batteries. The whole Hun-ward horizon was shut off by a wall of tumbling spray fountains. Unluckily, not all of the shells were striking the water, and among those that came aboard were several charged with some sort of asphyxiating gas. The fumes of one exploding near me were so thick that I could not see my hands before my face, and enough of the stuff was getting under my mask to make me feel very groggy when the blast from



an ordinary shell—although it knocked me off my feet—cleared the air and made it fit to breathe again."

The experiences of the survivors of ships that were sunk in the great battle were very terrible and it is only natural that they are spoken of with reserve. All of the British ships went down with their guns still firing, but one poor chap, who was in some way cut off from whatever had been his regular duties, confessed to me that the greatest relief he ever felt in his life was the deep, cool plunge into the sea out of the hell that was raging on the surface. "Fact is, sir," he told me, when I talked with him in his lounging chair on the terrace of the hospital where he was resting his shattered nerves, "I was so fed up with it, that I must 'a' ducked under a dozen times before I was picked up, just to get away fro' the bloody 'ell o' it all."

The doctor of a great superdreadnaught which, though dealing some heavy blows herself, went through the latter stages of the battle without a scratch, was just about the only person I have talked with who confessed to much in the way of introspection, and in his case it was undoubtedly due to inaction. He told me about it in the very operating room where, with his staff, he had waited for the wounded who, mercifully, did not come. "It was rather trying," he said, "standing by down in this little hole, with the guns booming above, the ship fairly throbbing with the vibration of her speeding screws, and never a thing to do but twirl my thumbs and think. I did a lot of it, but it was mostly the aimless sort of reflections that run through one's mind in waiting for a



*"One chap, who was devouring a penny dreadful, fairly fascinated me with the pop-eyed wonder with which he followed the story. . . . I realized that he was just a healthy, normal young Briton, taking things as they came."*

tram or a train. But my men did not appear to find the time hanging heavy in the least, nor to be at all tried, or even bored, by the restraint. One was writing a letter, another playing solitaire, and the rest were reading. One chap, who was devouring a penny dreadful, fairly fascinated me with the pop-eyed wonder with which he followed the story. At first I thought his preoccupation was sheer 'swank,' but after I had seen him turn two pages and then stoop down and replace an instrument that the vibration or the jolt of the guns had shaken from the operating table, all without ungluing his eyes from the page, I realized that he was just a healthy, normal young Briton, taking things as they came as a part of 'the day's work.'"

¶Passengers on German railways have been requested to supply themselves with warm clothing, as the management has announced that, on long trains especially, sufficient steam cannot be supplied in very cold weather.



# NEW TREATMENT FOR BURNS

## CONSIDERED REMARKABLE

WORLD'S WORK DEC 1916

Among the wounded on the battle fields are soldiers with horrible burns caused by bursting projectiles, liquid fire, or scalding water. On the western front the allies transport the worst of these cases to a special hospital near

Paris where the men are given the benefits of a new treatment that has lately come to public notice. In the short period of a few weeks, "living corpses" almost without human semblance that enter the institution, leave it without scars and, more wonderful still, with scarcely any visible evidence of the torturous injuries from which they have recovered. The treatment, the discovery of a French physician, is considered to be of inestimable value. Next in importance to the almost unbelievable results it accomplishes, is the fact that it banishes a patient's suffering within a few hours. It is a painless cure for burns of all kinds, including acid ones. After being cleansed with warm water and thoroughly dried with hot air, an atomizer is used to spray the burned flesh with a preparation composed of paraffin and resin, made liquid by heating it to a temperature of about 158° F. This gives the wound a waxlike coating, over which cotton batting is laid in thin strips. The hot liquid is then applied to the latter with a brush, an air-tight sealing thus being provided. This operation alleviates pain quickly and within 24 hours overcomes it. The dressing is

removed daily and the whole treatment repeated. Almost regardless of how serious a burn may be, the flesh grows back with a covering of new, smooth skin when this procedure is carried out properly. The paraffin-resin preparation is very difficult to make, and thus far no one except its discoverer has been able to manufacture it.



**WINGED MESSENGER OF MAN**  
Symbolical Bronze Statue, Weighing 16 Tons, That Now Crowns the Tower of the New Telephone and Telegraph Building at New York

also found that when an electric-equipped lantern is dropped onto a hard surface from a height of two or three feet the filament in the globe is most liable to break. These two things caused the company in question to abandon the idea. Lamps of the flash-

## ELECTRIC LANTERNS FAIL IN RAILWAY TESTS

Since portable electric lanterns of certain types are being used extensively in many industries, it is not strange that surprise is frequently expressed at the failure of railway companies to adopt equipment of this kind for trainmen. The idea is not a new one so far as most transportation companies are concerned, and the reason that coal-oil lanterns have not been generally discarded is that electric ones do not seem to be suited for railroad needs. Experiments were conducted some time ago by one of the big western lines for the purpose of determining the advisability of making such a change. The inquiry showed that the operation of electric lanterns would cost the company about seven times more than those of the usual type. It was



light type include the above objections and also have a third and equally serious one. Their very character, it is contended, would make the revision of the American Railway Association's code necessary before all signals could be rendered with them advantageously. Of course, on several of the big lines electric lanterns are employed by sleeping-car conductors, but that is about as far as their use has ever gone.

2024

### TARGETS TO KEEP HUNTERS FROM SHOOTING AT SIGNS

# *R. J. Mitzley, Menlo, Calif.*  
Recognizing the fact that many hunters seem to be possessed by an overwhelming desire to shoot at conspicuous signs, regardless of the damage that may result, the Automobile Club of California has provided special targets for such sportsmen in the hope that they will thereby be prevented from mutilating the road signs which the club has erected. The target, which is of the conventional form, is painted on the posts of the signboards. It is far enough below the lettered surface to save the latter from being hit, if a shot is fairly well aimed. Painted near each of these targets are these words: "If You must Shoot, Shoot Here."



Rather than have the Signboard Mutilated by Shot the Makers of This Sign have Provided a Target on the Post for Hunters Incapable of Self-Restraint

### INCUBATOR INSTALLED IN ABANDONED CISTERN

# *J. G. Mc Gurdy*

A cistern in Port Townsend, Wash., which had been abandoned because of the installation of a modern water sys-



Abandoned Cistern in Port Townsend, Washington, in Which an Incubator has been Installed; Storage for Fruits and Vegetables is Provided Also

tem, is now used as a storeroom and for hatching eggs. The owner dug away dirt at the side of the empty chamber, knocked in a portion of the wall, and built stairs down into it. The entrance was covered with a trapdoor. This transformed the empty cistern into a very desirable storage place that was dry and free from rats and mice, and was always cool without ever being cold enough to freeze. Here fruits, vegetables, and an incubator were kept. In this room the incubator hatched a higher percentage of eggs than ever before.

¶The United States government is to place an electric sign on the upstream face of a railway bridge over the Ohio River at Louisville, warning river voyagers of the dangerous falls about a mile below.



## GUIDING THE EAR BY THE EYE

### IN LEARNING TO SING

\* SCIENTIFIC AMERICAN

An instrument known as the tonoscope, shown in the accompanying illustrations, projects the vibrations of

especially in training singers and in making scientific investigations on singing.

The singer, standing at the side of a telephone apparatus, sings in front of it, or directly into a speaking tube not shown in the illustration, and the vibrations of the voice cause a little flame in a capsule at the center of the front of the apparatus to flicker so that it actually goes down and rises with every vibration of the voice. Inside of the case is a large drum containing over 18,000 holes arranged in rows so as to represent a series which makes a complete octave. If, for example, the singer sounds middle C, which makes 256 vibrations per second, the line on the drum which has 256 holes will seem to stand still and all the other rows are moving. The line which stands still points to that number on the scale. If he should sing a trifle sharp, then 257, 258, 259, or even a higher line, will stand still, and if he should sing flat a line of lower frequency would stand still, indicating the exact pitch.

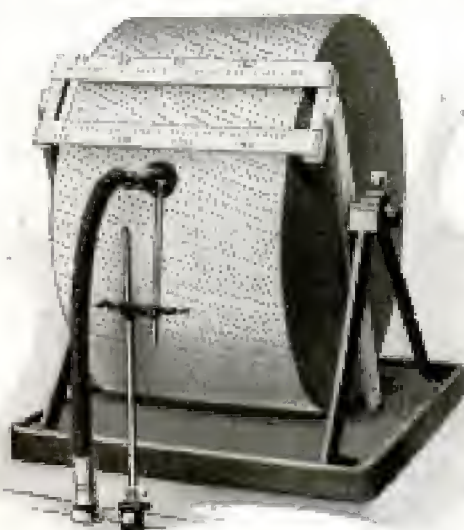
The sound is seen exactly simultaneously with the hearing and it is possible to register down to an accuracy of a hundredth of a tone, or even finer.

Educators of the deaf are interested in trying this principle in teaching the deaf to speak with pleasing intonation. A teacher can set a model so that the deaf person can learn to reproduce any given note by sight.

3408

## PUBLIC EMPLOYMENT SYSTEM IS PROVING ITS VALUE

According to an official announcement, the United States Employment Service, which is under the supervision of the Department of Labor, has succeeded



Mechanism of the Tonoscope, Showing the Revolving Screen Which Indicates the Pitch of Musical Sounds

the voice upon a screen, on the principle of moving pictures, in such a way that the singer or speaker can see the pitch of his voice the instant he sings or speaks. The instrument is used



Improved Model of the Tonoscope, by Which the Deaf may Teach Themselves to Sing and Play Correctly, without an Instructor





Scene on a Warm Day at a Portable Ice Station in a Crowded District of Columbus, Ohio,  
Where Cheap Ice may be Had by All Who Call for It

splendidly since its establishment about two years ago. The purpose of this institution, which is increasing in social and economic importance, is to promote the welfare of wage earners throughout the country and assist business concerns and individual employers in filling their vacancies. For the service it renders no charge is made. Offices are now maintained in 80 different industrial centers, and in order that their scope may not be limited, every post office has been made a local branch where employers and job seekers may obtain application blanks and forward them to the proper destination without postage. The volume and character of the work done at the Chicago headquarters has distinguished it as being one of the most important and efficient bureaus of its kind in the United States. Among other things, this office established the first public teachers' agency and thereby has done much in furthering the "better schools" movement. Careful investigation of all candidates is made before recommending them.

### PORTABLE ICE STATIONS FOR HOT WEATHER

Small portable ice stations are operated during the summer months by an ice company of Columbus, Ohio, which has found them both useful and profitable, while they are a boon to many families in the districts they serve. The stations are built by a refrigerator company in all sizes. The size used in Columbus is a little building, 16 ft. long and 12 ft. wide. A space, about 12 feet square, is used for the storage of ice—floor, ceiling, and sides being insulated with mineral wool. In front is a small office and platform, where ice is delivered to those who call for it. A sign on each station indicates its purpose, and the ice is sold at the rate of 20 cents per 100 lb., while ice delivered from the company's wagons costs 35 cents per 100 lb. The stations are intended to serve a class of people that do not buy ice regularly from wagons. They are placed for the summer at convenient points in thickly populated districts.

Western Refrigerator Mfg. Co.,

St. Louis, Mo.

Crystal Mfg. & Ice Co. 11-43  
297 W. Broad St.

3368



## CONCRETE VIADUCT BUILT ALONG A BOULEVARD

As part of the new rapid-transit system of New York City, it became nec-



This Concrete Viaduct of Ornamental Design Carries Elevated Trains for a Mile along Queen's Boulevard, Long Island City, and Is in Striking Contrast with the Ordinary Elevated Steel Structure

essary to run elevated trains along Queen's Boulevard in Long Island City. This being a fine example of the modern automobile highway, 200

ft. wide, it was decided to provide for the elevated railroad something more sightly and more suitable than the ordinary steel structure with its noise, vibration, and uncongenial aspect. A reinforced-concrete viaduct, in the form of an arcade, or series of vaulted concrete arches, with a solid floor, was decided upon and has now been completed after three years of work. It accommodates three tracks, and is about a mile long, and 44 ft. wide. The spans are from 52 to 65 ft. long, with clearances of 14 ft. for trolley cars. Three stations are built into the viaduct, with a mezzanine below the tracks for ticket booths. The concrete used in the structure was mixed at a central plant and hauled in buckets in five-car trains by locomotives of 24-in. gauge. Altogether 106,376 bbl. of cement were used in the viaduct.

## 3026 HOMEMADE CAR DRIVEN BY AIR PROPELLER

*Jerome Whetstone, Jr., 1203 Monroe St.*

A young man living in Sandusky, Ohio, has constructed a small car which is driven by an air propeller and can travel at a speed of 28 miles an hour. The car itself is a light homemade cart, 6 ft. long and 40 in. wide. It is equipped with 20-in. bicycle wheels, an automobile steering gear, and a metal body, giving it some

resemblance to a tiny automobile. Mounted behind the driver's seat is a 3-hp. marine motor to which is directly attached a 4-ft. propeller with blades 6 in. wide. The entire outfit weighs only 128 lb. It is the belief of the builder that by substituting a new propeller having blades with a greater pitch, he can increase his present rate of speed considerably.



Light Homemade Car, Driven by a Three-Horsepower Engine and a Four-Foot Air Propeller, Which can Attain a Speed of 28 Miles an Hour

A train, filled with various exhibitions and carrying 125 leading citizens of Arkansas, is now touring the country by way of advertising the resources of that state.



## BREAKING OSTRICH TEAM FOR CITY DRIVING



As Docile as Two Old Flow Horses after a Short Term of Training. These Big Birds of the Desert were Driven through the Streets of Los Angeles Some Time Ago Along with Motor Cars and Horses When That City's Gala Event, the Rose Carnival, was Celebrated

Tired Out after a Spirited Trot in the harness, and Resting His Neck across the Shoulders of One of the Trainers! Although He Is Powerful, and Exceedingly Capable of Pulling Heavy Loads, the Long Neck of the Young Ostrich, Before He has been Thoroughly Trained, Easily Becomes Exhausted

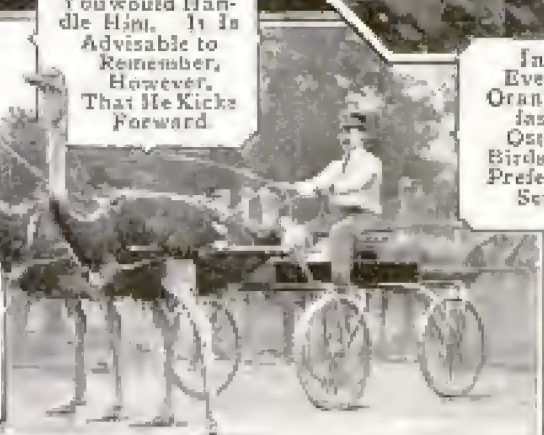


Grab an Ostrich by the Neck, if You would Handle Him. It Is Advisable to Remember, However, That He Kicks Forward



In California Everybody Eats Oranges for Breakfast, Even the Ostriches. The Birds, Incidentally, Prefer Their Fruit Served Whole

This Light, Four-Wheeled Rig was Used in Breaking the Team for City Driving so That It Might Participate in the Rose Carnival



To the Tenderfoot There Is Nothing Dull or commonplace about Bird-Back Riding. A Man Must Sit on an Ostrich! Just So, or There Is Awful Jolting in Store for Him

*Los Angeles Ostrich Farm*



## INSULATOR OF SPARK PLUG MADE DETACHABLE

One of the special features of a spark plug recently placed on the market is the construction of the insulator and the body as two separate units.



By pulling on a small bail attached to the porcelain insulator, the latter can be instantly removed from the spark-plug shell without the use of a wrench or other tool. In service, both parts fit together tightly and no gasket is necessary; a convex-ground seat in the shell is forced against a ground surface on the porcelain, making the joint leak-proof. The detachable feature of the plug makes it an easy one to clean. It is also convenient for priming cylin-

ders in cold weather, especially where there are no priming cocks on the engine. The insulator is simply slipped out and a few drops of gasoline inserted through the plug shell.

2588

## SUN TEMPLE OF GREAT AGE —UNCOVERED IN WEST

Recent excavations made in the Mesa Verde National Park in southwestern Colorado, under the direction of representatives of the Smithsonian Institution, have brought to light the ruins of a sun temple many centuries old. It seems probable that the structure was erected about 200 years before Columbus discovered the American continent. This estimate is based upon the age of a red-cedar tree which was felled when the excavating was undertaken. The tree, according to expert estimates, was about 376 years old. Furthermore, it had grown on top of the temple, which indicates quite conclusively that the structure was an abandoned ruin in 1540. It is believed that it was constructed about 1300 A. D. Obviously the discovery is a matter of considerable scientific interest.



Six Centuries Old Is This Sun Temple, Lately Uncovered in the Mesa Verde National Park in Colorado

D. Walter Fewkes,  
Smithsonian Institution,  
Wash., D. C. Copyrighted material



**DISPLAY-TYPE FACES CAST ON SLUGS BY MACHINE**

One of the important improvements effected in the printing industry of late has been the invention of a machine for casting display composition on slugs. Some of the advantages are that cost is reduced, an unlimited supply of clean, new type furnished for every piece of work, and time and floor space materially saved. Furthermore, expensive foundry type is conserved, and without reducing the quality of the work. The matrices which are used are set by hand in sticks of a special kind, locked in the machine, and the slug cast. Sticks are made for lines as long as 10½ in., but when these are used, more than one casting is made, the machine taking care of the justification automatically by indenting one slug and overhanging the next. When many duplicates are wanted, as in the cases of blanks, rules, borders, and similar things, the machine will recast until stopped. One large printing establishment has found that the apparatus will produce display work in less time than it can be set from a case, that the elimination of type distribution means a big saving, and that "more matter can be set with \$25 worth of 'mats' than with \$2,500 worth of foundry type." Two of the machines have replaced three sort casters and 350 cases of type, each weighing about 40 lb., in the composing rooms of one of the big western dailies. This has resulted in a saving of about one-half of the floor space.

By the use of angle spaces, italic faces can be used in a line with Gothic or Roman ones, while the readiness with which slugs may be handled greatly simplifies make-up. Forty-eight point matrices are the largest used. The



One of the New Type Machines in Use, and at the Left, the Matrix Cabinet. Below is Shown a Partly Filled Stick, Turned Over so That the Type Matter can be Read from Left to Right, Each Matrix having the Letter It Casts Stamped on the Back. Beneath It is a Form Made Up of Slugs Cast by the Machine

system embodies no departure from the ordinary methods of hand composition.

**3419 —  
 PORTABLE CONCRETE MIXER  
 OF BARREL PATTERN**

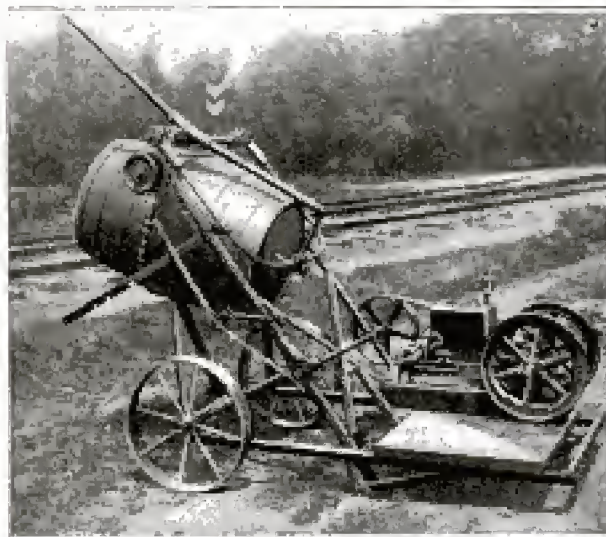
Serviceable for the village contractor on small jobs is a portable concrete mixer of the barrel type that is to be brought out this spring. The apparatus is mounted on a substantial angle-iron frame which is provided with a pair of metal wheels at the front. This enables the outfit to be coupled to a truck or wagon as a trailer and

Barrel Mixer Co.  
 446 Washington Bldg.  
 Madison, Wis.

Messrs. Thaler & Son, 1000 Broadway, N.Y.C., Chicago, 549 Wabash St., Agents, Ag.



*Refer to Rev. P. 318 Kelly & Co.*  
*2/8/14 Sheldon Mfg. Co.*  
 transported over ordinary roads. Power is supplied by a capable gas engine fixed to a platform at the rear of the

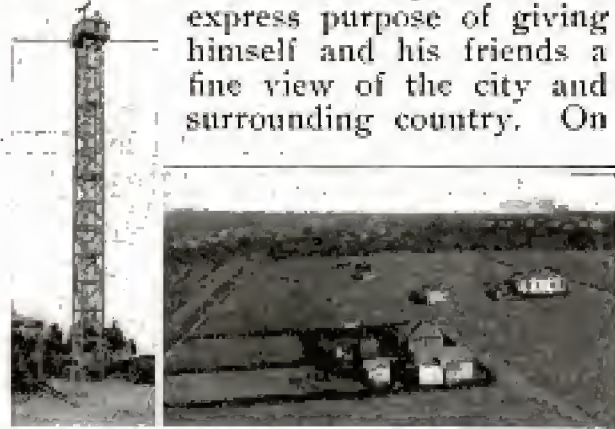


This Portable Mixer will Handle a Wheelbarrow of Concrete at a Time, and can be Carried as a Trailer by a Truck or Wagon

frame. For culvert, curbing, or sidewalk work that requires the services of only five or six men, the equipment is quite adequate and much more satisfactory than an old-style mixing box. Metal baffle plates within the barrel assure the proper mixing of about two and a half cubic feet of material at a time. The mounting is such that the barrel can be revolved while it is tilted to discharge into a wheelbarrow.

### OBSERVATION TOWER BUILT IN TEXAS BACK YARD

A private observation tower has been erected by a resident of San Antonio, Tex., in his back yard for the express purpose of giving himself and his friends a fine view of the city and surrounding country. On



A 75-Foot Observation Tower Built by a Resident of San Antonio, Texas. At the Right is Shown the View from the Summit of the Structure

a clear day a splendid outlook can be gained from this observation point. The structure is 75 ft. high and is surmounted by a railed platform, 7 ft. square, to which access is gained by a ladder. The corner posts of the tower, which is square, are composed of 4 by 4-in. beams, and the bracing members of 1 by 6-in. planks. The framework is kept steady in the face of varying winds by eight  $\frac{1}{4}$ -in. cables, which terminate at their lower ends in heavy concrete anchors. Each guy wire is drawn taut by means of a turnbuckle. The builder and owner of the structure contemplates offering it to the government for use as a signal station.

### LATE DISCOVERY SHOWS SUN TO BE VARIABLE STAR

As one result of an exhaustive study of solar radiations by the director of the Smithsonian astrophysical observatory, it has been found that at the earth's mean distance the heat of the sun's rays is sufficient to melt in a year's time a layer of ice 426 ft. in thickness. This, it is announced, indicates that the aggregate heat thrown off by the sun in 12 months amounts to the same as would be obtained by consuming 400 sextillion tons of hard coal. Incidentally, and most fortunately, only a small portion of this tremendous volume of heat reaches us, all but about four ten-billionths of it being lost in space. Another very interesting and important discovery, which is acclaimed the principal result of the investigations, is that the sun is a variable star. The heat emitted by it instead of being constant in intensity, changes from day to day and year to year. It is believed probable that this has a direct bearing upon the climatic conditions of the earth. In the hope of gaining further enlightenment on this score, a South American expedition is to be undertaken this year for the purpose of making additional and more complete observations of solar variation. The work will be undertaken in the most favorable cloudless region.

*H. G. Engelman,*  
*Houston & Zarahora Sts.,*  
*San Antonio,*  
*Texas.*



3567

## DANCING WITH DEATH ABOVE THE SKYSCRAPERS



PHOTO BY NICH. PHOTO NEWS CO.

**B**LOCKING Broadway traffic just for the fun of skylarking—a dazzling, daring wire-walking performance which caused 6,000 persons in City Hall Park to crane their necks and gasp. This is one of the places where composure and strict attention to business count, for it is 250 feet straight down to the nearest pavement. But to this sure-footed girl it is no more difficult to be graceful 22 stories above oblivion than before a sea of opera glasses and a blinding spotlight, except, possibly, when fluffy skirts make a fickle breeze a bit inconvenient. When one is filled with the sickening sense of fear, smiling is far out of the question. But this little maid is really having a rollicking good time of it, laughing and prancing all by herself and happily oblivious of the open-mouthed, nervous New Yorkers far below.



### NEW SLEEPING BAG ADOPTED 3584 FOR ARMY USE

A sleeping bag with decidedly novel and useful features has been adopted recently by the United States Army upon the recommendation, it is said, of the general commanding the forces

along the Mexican border. The bag was designed and is made in Los Angeles, Calif. It is constructed of water-proofed material in two different weights, adapted for different climatic conditions. Though the model for army use weighs only 3 lb., it affords complete protection to the sleeper. The

*Chicago 1404 So. 5th St. A. C. Co.*

*Standard Felt Co.  
New York City*

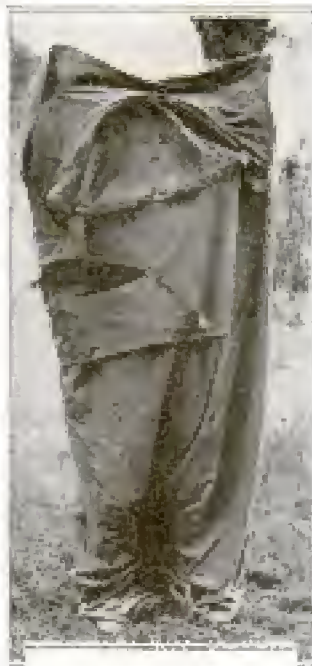


*Ino. F. Ljunggren.  
Gothenburg, Sweden.*

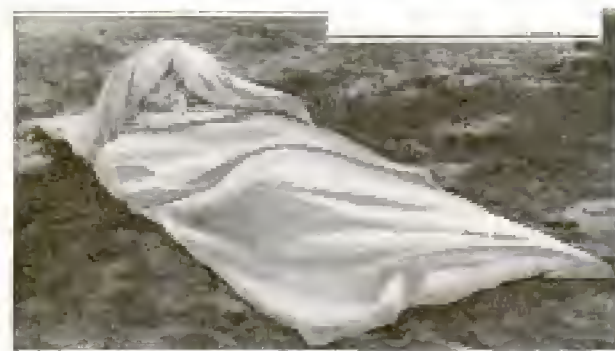
face is protected by mosquito netting attached to a hood or awning held in place by a small rattan bow. A felt pad, 1 in. thick, contained in a long pocket, serves as a mattress from the



A United States Marine with the Sleeping Bag Folded, Ready to be Placed in the Knapsack



The Man in the Picture, Peering through the Netting, Holds the Sleeping Bag and Disables Inside



New Army Sleeping Bag in Use on Sandy Soil: Note the Face of the Sleeper, Visible through the Mosquito Netting

sleeper's shoulders to well below the hip line. There are small pockets for a revolver, watch, flash light, and medicines, etc. The bag is washable, and packs easily into a knapsack.

It is proposed permanently to equip an auditorium in Albany, N. Y., with numerous telephone receivers so that, if need be, the entire legislature can sit and hear words spoken by persons in other parts of the country.

### SMALL RANGE FINDER MADE FOR GENERAL PURPOSES

Not only of value for army and naval purposes, but also suited for the civil engineer and surveyor, is a short-distance range finder of simple character that has lately been protected by the Swedish patent office. Its fundamental principle is that the degree of the angle, formed by the convergence of the lines of vision, depends upon the distance from the eyes to the object viewed. Held between plain glasses, mounted in a frame or field glass, are two cross hairs whose positions, in relation to the eyes of the observer, are known. In use, the cross hairs are adjusted so that their points of intersection coincide as vision is focused upon a specific object. This action is accomplished with a screw, while the amount of the inward motion is magnified by connection with a drum having a spiral line, on which the reading is made. The instrument is supplied with a saddle and a metal strip, the one straddling the user's nose as a spectacle bridge, and the other being held between the teeth. Its compactness enables one to carry the instrument in a pocket.

### HEAT REMOVED FROM LIGHT BY AIR CURRENT

By employing two slightly separated lenses, held in individual mountings, and passing an air current between them, a French authority has been able to free the high-power light of projection machines from the intense heat which has been characteristic of it. The draft of air disperses the heat mechanically and does it so completely that the second lens receives practically a cold light. Objects which are highly sensitive to heat can be exposed to the rays without danger of injury. This makes it possible to use a light of sufficient intensity to permit the reflected projection of the images of different objects in an illuminated room. It also enables the substitution, in the motion-picture industry, of paper ribbons for celluloid films.





# The Training of Airmen

by J. G. Gilpatric,

~~an Old-Time Pilot~~  
297 Madison Ave.,  
N.Y.C.

ALMOST every one has seen an aeroplane in flight, but with the present-day layman, the interest is centered more on the airman than on the machine with which he does his flying. Naturally, the first question is, "How did he learn to fly?"

Of necessity, the pioneers of aviation taught themselves the then difficult and dangerous art, and all the airmen in the world today owe their flying ability to the Wrights, Blériot, and others of the men who went before. There are flying today a number of airmen who entered the game in the early stages, and who, by luck and perseverance, mastered the art with very little outside assistance. These men were without more than a rudimentary idea of the very principles of flight, and later realized the dangers they had undergone; they knew that the average person could scarcely survive a self-administered course in airmanship. Aviation had come to stay, and a number of firms started regular schools in which the knowledge of the earlier experimenters could be disseminated among the ever-growing numbers of enthusiasts.

There are three basic methods of

teaching flying—the so-called French system, the dual-control system, and a combination of the two largely used today for training war pilots. The French system was the first in general use, and consisted in teaching oneself to fly by the constant criticism, advice, and demonstration of a competent pilot instructor. The pupil was given a heavy, low-powered, and worn-out machine incapable of flying—usually called a "taxi"—and was given practice in running the machine on the

ground. In this way he accustomed himself to the speed of an aeroplane, the incessant roar of the motor, and the use of the controls. When the pupil could run down the field in a perfectly straight line, and do it consistently, he was given "hops."

"Hops" were made on a machine but slightly better than the taxi, and consisted in making short jumps across the field at a height of four or five feet. This was the most trying part of the entire course, as

at this point smashes were most likely to happen. If the pupil misjudged his height from the ground, or in his enthusiasm tried to stretch his hop into a sustained flight, the ending was usually disastrous. But if he went about mat-



An Old-Time Single-Control Machine Flown by a Pupil Who was Well Advanced in His Course



ters sensibly, he would soon be promoted to "straights," or flights in a straight line, about half a mile long. The usual height in this work was 25 or 30 feet from the ground.

Having mastered straights, the pupil was given a fairly respectable aeroplane, and set to making circles. Flying three or four hundred feet from the ground, the pupil would now consider himself a finished airman. If this misapprehension did not make the pupil reckless, and result in a thoroughly smashed machine, the rest of the course would be easy. His landing practice—derived from his ground work—would now be confined to landing on a mark, or trying to. His air work would extend into figures of eight, descents with the motor shut off, and other maneuvers necessary to ordinary flying.

At every step during the course the instructor would show just what he wanted done, and the pupil could profit vastly by emulating him. Finally, when the pupil was considered competent by the instructor, he was sent up to fly for his aero-club license.

The license tests consist of two series of figures of eight flown around two flags placed about 1,000 feet apart, and of making landings within a radius of 160 ft. of a mark on the ground. During the landings the motor must be shut off and the machine handled without power.

The French system had the advan-

tage of instilling self-confidence in the pupil, as he was always alone in the machine. Its disadvantages were chiefly the length of time necessary, and the cost of such a course. The very fact that the pupil was alone prevented work in any but the finest weather, and for their own protection the schools were forced to charge for breakage of the machines. This latter item some-

times ran as high as \$1,000, besides the usual \$400 for the course itself. Despite the amount of breakage done by careless or headstrong pupils, surprisingly few were injured. From 1912 to 1914 the writer trained nearly 60 pupils by this system without anyone being so much as scratched.

The dual-control system teaches wholly by demonstration and practice in actual air work. A high-powered machine fitted with duplicate controls is used, and the pupil starts by riding with the instructor and watching him

work. By simply resting his hands and feet on the controls, the novice can feel the amount of motion necessary to handle the machine. Gradually, the machine is given over to the pupil—the pilot being ever on the alert to correct his mistakes and to demonstrate new points. As the pupil becomes more and more skillful, the pilot requires harder evolutions.

The writer believes in actually demonstrating every condition that may cause the pupil a smash when he finally flies alone, and the remedies to employ



Photograph of Toronto, Canada, Taken from a Dual-Control Machine Used for Training Airmen for the British Air Service





Typical Class at a Modern Flying School: Young Men Particularly are Attracted by Aviation Because It Combines Sport with Work

should such conditions arise. When this work is done at a sufficient height from the ground, so that there is always room to regain control of the machine, it may be done with perfect safety.

The dual-control system of teaching is somewhat hard on the instructor, as it often necessitates five and six hours in the air every day for weeks at a time. The average time in the air required to train a pupil by this method is 400 minutes, which is divided into flights of 20 minutes each. It is now used in this country by all the government schools and the private firms.

The combination, or English, system consists of equal parts of ground work alone and air work with the instructor. As the pupil becomes more advanced, the ground work is gradually dispensed with and air work—still with the instructor—substituted. Finally the pupil flies alone and after some practice is sent for his license.

Flying is not hard to learn. The essential assets are common sense and patience—nothing else is required. If a man has common sense he will realize how safe flying has become, and he will enjoy a reasonable self-confidence. If he is patient, he will not hurry through his course. A slipshod knowledge of flying is more dangerous than none at all. By taking things easy, a month or six weeks spent at a good

aviation school will make a raw layman into a fairly well-trained flier—and it will give him the best sport of his entire lifetime.

3 5 6 8

#### VACUUM BOTTLE PRINCIPLE USED FOR COFFEESPOT

Designed particularly for the hotel and dining car, but well suited for the home, a vacuum coffeepot, which keeps its contents hot for many hours, is being introduced. Since it is intended for individual service, it is provided in two sizes which hold a trifle more than one and two cupfuls, respectively. The larger pot is about six and a fourth inches in height and, like the other, has a highly polished nickel finish. It is fitted with an all-metal lid which is hinged and ingeniously fitted so that it acts as an airtight stopper and makes the use of a cork unnecessary. The lines of the pot are shapely, and the inner glass lining is protected against breakage.



ⒸThe supports for a recently constructed New Zealand wharf include 20-ton concrete piles 100 ft. long.

ICY-HOT BOTTLE CO.,  
DETROIT, MICH.



## SMOKING OUT FUR-BEARING ANIMALS NOW PROFITABLE

An unusual haul was made by a hunter near Waukon, Ia., last season when he shot 16 skunks which were smoked out of a single den. The prac-

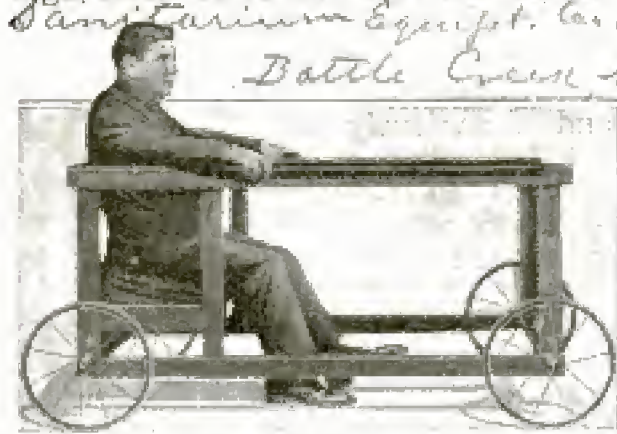


View of the Mouth of a Den near Waukon, Iowa, Taken Immediately After 16 Skunks had been Smoked Out and Shot

3285

## CHAIR IN WHICH PATIENTS RELEARN TO WALK

An invalid's wheel chair has been devised for use by persons who have been temporarily disabled and who must learn over again how to walk. The chair consists of a simple wooden frame, about 5 feet long and 18 inches high, mounted on four wire wheels, and



Chair Designed for Convalescents Who must Learn to Walk Again: The Patient can Push Himself About with His Feet or Walk Leaning on the Sides of the Chair

tice of smoking out animals is being revived in many parts of the country because of the increase in the price of furs. A smoker now much used consists of three detachable parts: a bellows, a smoke chamber, and a nozzle. The chamber is partly filled with rags, old burlap, or corncobs, to which is added a little sulphur or cayenne pepper. This is set afire and the smoke blown into the den after all exits and air passages, save the one being guarded, have been tightly closed. Ten or 20 minutes' blowing will drive the animals out, weak and dazed, so that they can be killed or captured easily. To avoid waste and rapid depletion of the fur-bearing animals, hunters should kill only well-furred creatures.

having a cushioned seat at the rear, quite close to the floor. The frame serves as a back and arms for the seat. A patient seated in this chair can either push or pull himself about with his feet, while he grasps the sides with his hands. As he gains strength he can stand between the sides and lean on them as he walks. Practice of this sort is designed eventually to restore to the patient the normal use of his limbs.

*Sanitarium Equipment Co.  
Battle Creek Mich.*

3538

## SCENERY LOVER BUYS PEAK AND CUTS TRAIL TO TOP

In order that a picturesque pinnacle overlooking the Columbia River might be preserved, a westerner some time ago purchased it from a contractor who was making preparations to quarry its stone for building purposes. Since then the man has expended \$20,000 in blasting and carving a trail part of the way up the precipitous walls of the peak toward the summit, which is





A View of "Castle Rock," Overlooking the Columbia River, Which Gives One an Idea of the Magnificent Character of the Local Scenery



The Business of Building a Trail to the Summit of the Peak has Not Been a Simple One: The Walls of the Rock Are Upright, and Workmen, to Safeguard against Falling, Fasten Securely Anchored Ropes about Their Waists

about 850 ft. in height. When completed, this path, some four feet in width, will be nearly a mile in length and represent an investment of about \$30,000. It doubles back about 50 times in making the ascent, and at each of these turns is level and 8 ft. wide. At narrow points, reinforced-concrete slabs have been laid to give the path a uniform breadth. The work has been attended with much difficulty and considerable hazard. When the task is finally finished, the trail, from which a magnificent view is afforded, will be open for the public to enjoy without charge.



*Marconi Wireless Telegraph Co. of America*  
*233 Broadway*  
*New York*



Panoramic View of the Mast Line of the New High-Power Radio Station at Koko Head, Hawaii, Which by the Company for Its Employees. Koko Head, an Extinct Volcano, is Shown at the Extreme

## BIG RADIO STATIONS LINK EAST WITH WEST

Within the last few months another important link in the around-the-world chain of high-power wireless plants has been forged. The opening of the new radio station at Funabashi, near Tokyo, has connected the Orient with the Occident and reduced the minimum rate for trans-Pacific commercial communications from \$1.21 a word—the cable charge—to 40 cents. At present the Japanese-United States service is confined to San Francisco, Hawaii, and Japan. The distance between the Golden Gate plant and that at Kahuku, Hawaii, is 2,087 miles, while in jumping from the latter place to the Japanese station the waves travel 4,140 miles.

It probably is unknown to the majority of persons that Hawaii boasts two separate high-power radio plants.

Both are included in the general system, but for the present only one of them is regularly used in the East-and-West service. At Koko Head, about 10 miles from Honolulu, one of these stations is situated. It was originally planned as the receiving station in Hawaii, but is now used only as the demands of service require. Its erection presented several knotty engineering problems, not the least of which was the transportation of materials. The Japanese aerial towers at this station are interesting. The first two are 430 ft. high and of sectional type. From the latter one, the aerial makes a span of 2,000 ft. to the top of Koko Head, an extinct volcano of 1,194-ft. elevation. Sufficient room was not available for a sectional mast there, so a self-supporting tower was erected



At the Present Time the Wireless Station at Kahuku, Hawaii, Which is Claimed to Be the Largest One in the Japanese and San Francisco Aerials, and the Masts for the Former Each Have a Height of





Is But a Few Miles from Honolulu. The Building Which is Included in the Picture Is a Hotel Erected Right, and on Its Summit, Faintly Visible, Is One of the Towers Supporting the Japanese Aerial

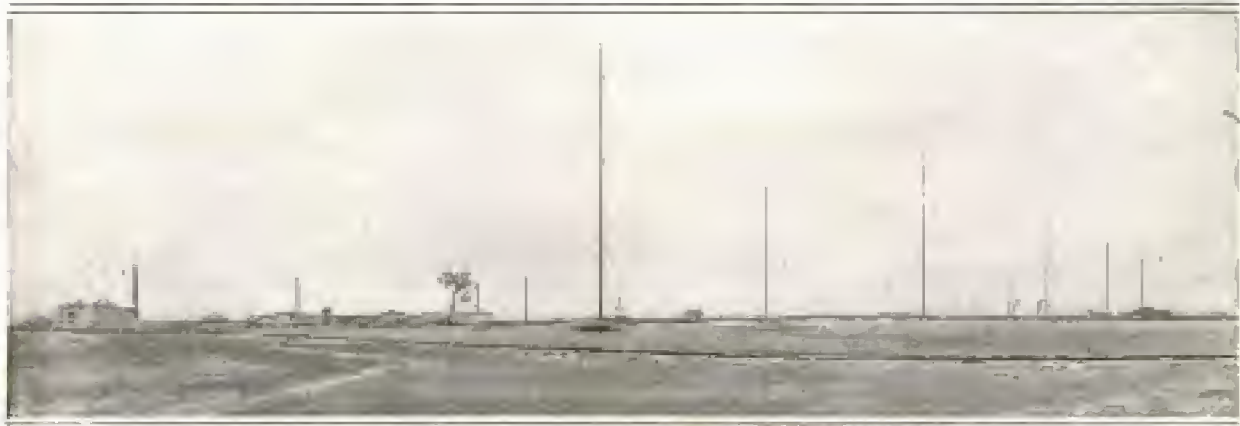
and the anchorage established far down inside the crater. The balancing aerial is on self-supporting towers situated in a pond where it was necessary to sink caissons to establish foundations. The Hawaiian station at Kahuku, the northernmost point of Oahu, is claimed to be the largest wireless plant in operation. It is both a sending and receiving station. Here the San Francisco sending aerial is supported by 12 masts, each 325 ft. in height. The Japanese aerial is also held by a dozen towers, but the height of each is 475 feet.

The idea of circling the globe with wireless plants was evolved about four years ago. It has brought about the erection of the New Jersey stations at New Brunswick and Belmar, which work with corresponding stations in England, and the construction of sending and receiving plants at Bolinas and

Marshall, Calif., which link the Pacific coast with the Koko Head and Kahuku installations and two similar plants to be established at Manila. Stations planned for Marion and Chatham, Mass., are to connect with Stavanger and Naerbo in Norway. The Funabashi station is controlled by the Japanese government and has both civil and military operating staffs.

### 3511 CROCHETED MODEL OF LAWN MOWER SENT TO ATTORNEY

One of the many patent attorneys at Washington was recently the recipient of a most unusual model of a device for which a client sought protection. It was a crocheted reproduction in the miniature of a motor-driven lawn mower invented by a California woman. Being proficient in needlework, but not in drafting, she crocheted a model of



Operation, Is Employed Both as a Sending and Receiving Plant. Here 24 Towers are Used in Supporting 475 Feet. This Station Is the Radio Connecting Link between the Orient and the Occident

*Mrs. T. H. Pratt  
Visalia Calif.*



*The Rosalie Mfg. Co.,  
Lynchburg, Va.*

*3537*

### SHEET-METAL SPLINT NEW FIRST-AID ACCESSORY

Telescoping sheet-metal splints, suited particularly for emergency purposes, have been invented by a Virginia surgeon. They are semicylindrical in shape and provided in three 12-in. sections, the longitudinal edges of which are flanged so that one segment fits into another, and the three, when extended, are held together rigidly. When the separate members are compactly telescoped, a package a foot in length, holding bandages, adhesive tape, pins, scissors, tissue, and other first-aid supplies, is formed. The sections are used according to the conditions presented. One segment, for instance, is sufficient when a fracture of the forearm, head, or ribs is given attention. Two of them, disjointed, are used if a whole arm needs support, while all of them are fitted together to form a splint for a broken leg. Parallel slits in the metal permit strips of

the mower and its propulsion attachment. Every part of the machine was reproduced in her extremely novel piece of needlework, which was subsequently



starched—so that it would have shape as well as the strength to stand alone—and dispatched to the capital. Her work was so well executed that a draftsman experienced no trouble in making detailed drawings of the invention.

*3569*

### BIG GIFT FOR DISCOVERY OF LIGHT AIRSHIP FUEL

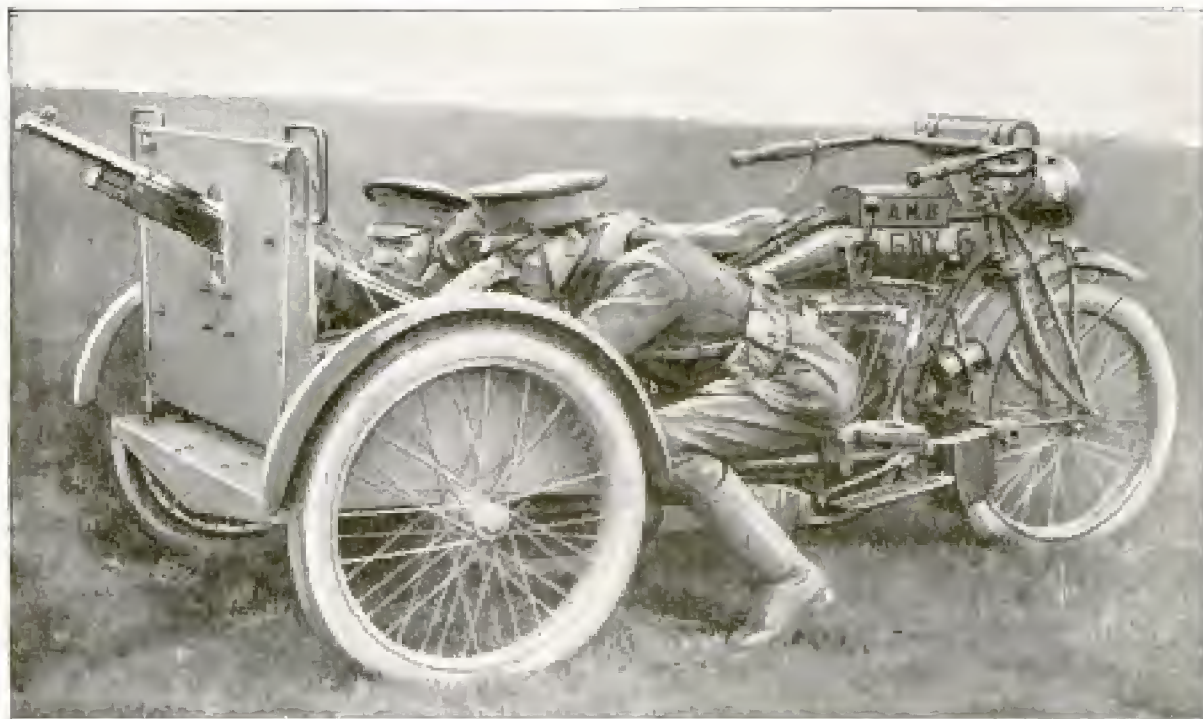
*Aerial Age*  
A \$10,000 bequest, which at some future time may produce revolutionary changes in the development of aerial navigation, was included in the will of the late Samuel H. Valentine, formerly governor of the Aero Club of America. This veteran aviation enthusiast willed this sum to the club to be used in establishing a prize, or prizes, for the encouragement of the builders of air craft which will not use gasoline as fuel. Before his death the donor became deeply interested in the problem of obtaining a fuel, lighter than gasoline, with which it would be possible to make longer aeroplane flights. The conditions under which the money is to be awarded are left entirely with the Aero Club.



Showing Two Sections of the Metal Splint Applied to a Fractured Arm

bandage to be passed through so that the splint can be securely tied in position.





Machine-Gun Outfit Recently Acquired by the First Armored Motor Battery of New York

2778

## MOTORCYCLE GUN CARRIAGE MOUNTS RIFLE AND SHIELD

A motorcycle machine-gun outfit, recently provided the First Armored Motor Battery of New York, has a number of unusual features. The gun carriage is attached as a trailer to a twin-cylinder machine of standard make, and mounts a two-part shield. The latter is so pivoted that the operator is afforded full protection when turning the rifle horizontally. The upper part of the shield is independent of the bottom, and turns with the gun, while the armor is 2 in. thick and will stop rifle bullets at 50 yd. A very simple contrivance holds the gun and shield in place and enables them to be demounted from the carriage in about a half minute. Two legs, hinged to the ends of the bracket which serves as the pivotal mounting for the upper and lower sections of the shield, permit the unit to be used at any angle when placed in firing position on the ground. A solid base for the gun and armor member is formed when the legs are locked. Handles are provided at the top on opposite sides so that two men can carry the unit to a desired place

after removing it from the trailer. In-trenching tools are strapped to the rods connecting the motorcycle and carriage.

3252

## WINDING INDICATOR FOR WATCHES

The tendency to overwind a watch, or on the other hand, not to wind it often enough, has been provided against by a winding indicator with which certain high-grade watches are now being equipped. A dial resembling the second-hand dial, is situated immediately below the figure 12 on these timepieces and is provided with a small hand that slowly revolves to the right or left according as the spring is being wound or unwound, its position indicating how near the watch is to being run down. The device serves as a safeguard against too tight winding.



*Joseph Mayer,*

*McAlister* copyrighted material  
*Wila.*



See Arch — 1910 h 331  
 " June — 1911 h 778

3577



Not Half so Big as Many Private Garages, yet Possessing the Conveniences of a Residence with Five Large Rooms, This Little House is Brimful of Striking Features. Hardly a Square Inch of Its Space is Wasted

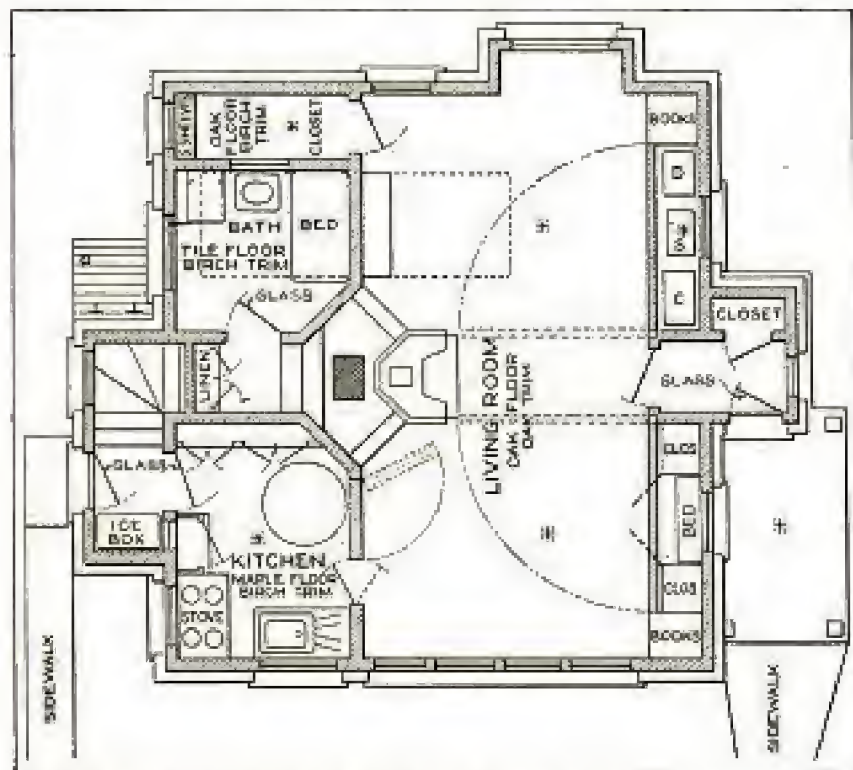
## COMPACT BUNGALOW WITH FOLDING ROOMS

WHEN distinctive qualities embody character and promote comfort, an unusual residence fosters interest. That is the way with a small brick bungalow at Evanston, Ill., a house of swinging walls and disappear-

ing rooms, that has amazed all who have examined it. It is a tiny, sun-flooded "doll's house" with light walls, white woodwork, and attractive, simple hangings.

The bungalow has been erected by a

Chicago designer of uncommon dwellings, for the purpose of trying out an idea fundamentally intended for incorporation in city apartments. Its outside dimensions, not including the protuberances, are about 27 by 25 feet. Yet it is a five-room house with a living room, approximately 13 by 25 feet in size; two bedchambers, about 10½ by 14½ feet and 10 by 14½ feet, respectively; a dining room, 10 by 14½ feet, and a kitchen, 7½ by 10½ feet, as well as a toilet room, small hall, one very roomy closet, and a kitchen entryway which accommodates a refrigerator.



The Arrangement of the Bungalow as Well as an Exposition of the Interesting Ideas It Embodies, are Afforded by the Floor Plan Above



Swinging walls are the secret of all this. The little house is really divided into a living room and kitchen. But only a trifle more time and energy are required in unfolding a fully furnished bedchamber, or a dining room, than attends the opening or closing of a door. The north walls of the living room—which are separated by a doorway opening into a small reception hall—are hung on hinges and supported by heavy



Showing the Full Size of the Living Room. The North Walls—at Right—Swing as Indicated, While Doorway Opens into Small Reception Hall

and decreases the length of the living room to about 14 feet. A bed, to the foot of which a bench is attached, is then drawn out from the opposite wall. A doorway in one corner gives access to and from the other rooms.

The other—the east—end of the living room is converted into a dining room by a similar operation. When the wall in



This Is How the Living Room Appears When That Part of It Shown in the Background of the Picture Above is Used as a Bedchamber

ball-bearing rollers. Firmly attached to the wall in the west half of the room, its legs reaching to within a half inch of the floor, is a library table. On the other partition is a writing desk. Concealed behind the former wall are a dresser, chiffonier, and sewing machine. When this wall is swung back to form a bedroom, it fits the beamed opening extending from the hall doorway to the fireplace,



By Opening the Wall and Drawing Out a Settee, This Light, Roomy Bedchamber is Provided. At Other Times Its Furniture is Hidden





The South Wall and East Exposure of the Living Room: At the Right Is the Settee Attached to One End of the Disappearing Bed. The Doorway Leads to the Bath, While That Adjacent to the Photograph Opens into the Kitchen

that half of the room is opened back and fastened in place beneath another beam, extending parallel with the first-mentioned one, an attractive built-in china closet is disclosed, and a real dining room provided. Obviously, at such times the west end of the main room becomes the living room. And in this connection it will be observed that the fireplace, library table, and writing desk always appear in the living room, regardless of how the latter is formed. Another hinged wall, this on the south side of what has now become the dining room, permits the dining table to be moved in from

the kitchen. Two glass doors in the middle of the china cabinet disclose a wall bed of full size, when opened. As in the other case, a doorway in one corner gives access to a couple of steps which extend to a landing, whence one reaches the toilet room, which is elevated a few feet, on the other side of

the temporary partition. The ceilings in the living room, on either side of the beams, are vaulted. This gives space for a couple of small windows at the top of the room.

It cost about \$2,200 to erect this house. Application for patents has been made by the architect.



Surprising Dining Room Formed in 10 Seconds by Shutting Off East End of Living Room. Doors in the Middle Hide Another Bed



### KILL RATS UNDER JAIL WITH BOILING WATER

Vast numbers of rats, which have infested the Los Angeles city jail, are believed to have been killed by injecting boiling water into the network of little tunnels which the rodents had made under the building. On one occasion approximately 5,000 gallons of water was drawn from the heating boilers in the basement for this purpose. The unusual procedure was repeated several times. It was the theory of those who worked out this plan that not only would the water scald or drown the animals but they would be satisfactorily buried by the caving in of their passageways.

3496 —

### HOT COFFEE SERVED ON TRAINS IN PAPER CUPS

The selling of hot coffee in the day coaches of certain trains on the Chicago, Milwaukee, and St. Paul Railway is an innovation which has proven popular with persons taking short trips at night and those who do not care to patronize the diner. The coffee is served from a tray by the news agent, in tall cups of durable paper composition. The cups taper toward the top so that their contents do not spill easily. When they have been used once they are discarded.



Serving Hot Coffee in a Day Coach: An Innovation Recently Introduced on a Western Railway. The Beverage is Contained in Sanitary Paper Cups That are Thrown Away after being Used Once

### LARGE STATUE OF LINCOLN PRESENTED TO OHIO CITY

Within a short time a new full-length statue of Abraham Lincoln will be



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Massive Sculptured Head of New Lincoln Statue Which is to be Erected in a Cincinnati Park

erected in Sinton Park at Cincinnati. It is the work of George Bernhard and a gift to the city by a woman of considerable prominence. The figure is in bronze and is intended to rival the late Augustus Saint-Gaudens' famous conception of the martyred president which was unveiled in Lincoln Park at Chicago about 30 years ago. It is of colossal size and great weight, and is said to be valued at \$100,000.

One of the electric locomotives employed on a section of a western railway which has been electrified, recently made an exceptional run of 339 miles without receiving any special attention en route and at the end of the journey was in condition for the return trip.

*Miss Bernice C. Taylor*



Perma. N. O. Publicity Bldg.,  
Broad St. Station, Phila.

208 3444 POPULAR MECHANICS

### SAFETY-FIRST CALENDAR FOR SCHOOLROOMS

A calendar designed especially for schoolrooms is a feature recently introduced in the safety-first agitation by



A Calendar Which Warns School Children against Trespassing on Railroad Tracks and Gives Some Appalling Accident Statistics

an eastern railroad. It is intended especially to warn children and adults against trespassing. The upper part is occupied by a picture, entitled "The Dangerous Shortcut," and depicts school children crossing a railroad track on which a train is swiftly approaching, when they could have used a near-by bridge. Various safety-first admonitions are printed on the leaves for the various months. Boys are particularly warned against jumping onto moving trains. The calendar also contains some appalling accident statistics.

3546

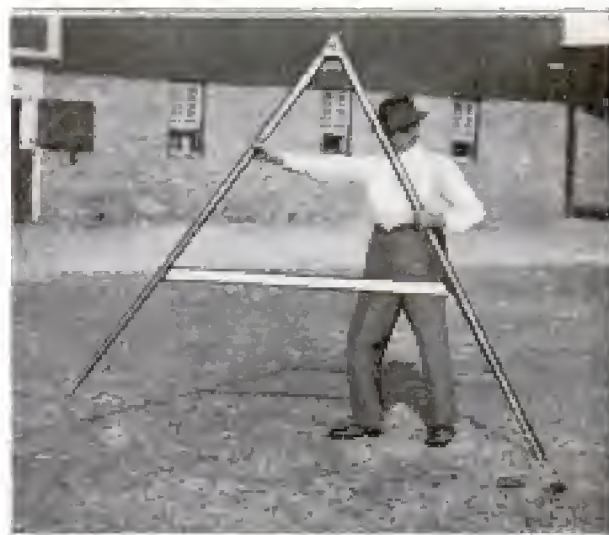
### NEW TYPE OF RABBIT IN WESTERN KANSAS

From western Kansas comes a report that a new breed of rabbits has appeared in great numbers in several counties. The animals have been called "Bel-rabbits" because it is believed that they are a cross between jack rabbits and Belgian hares. About three years ago two crates containing Belgian hares, which were being shipped to

Colorado, were damaged, and the animals escaped across the Kansas plains. The interbreeding of these creatures with the native rabbits is regarded as the beginning of the new type. The Bel-rabbit is described as being more heavily built than a jack rabbit and hence less fleet, so that occasionally a boy can run one down. As food the animals are very palatable and lack the strong flavor which characterizes the variety native to Kansas. They are fond of many vegetables which jack rabbits do not eat.

### LARGE MEASURING "COMPASS" USED FOR FARM PURPOSES

Few linear-measuring devices are so queer either in appearance or method of use as is a contrivance employed by an Illinois man. It consists of two poles, joined like the legs of a draftsman's compass, and so set that they have a span of 8 ft. 3 in.—one-half rod. For determining distances or computing areas the device is held in both hands and swung so as to describe a continuous series of semicircles; pains, of course, being taken to follow as nearly as possible a straight line. This operation can be performed without difficulty while walking at an easy gait. Although only approximately correct estimates can be made in this way, the results are sufficiently accurate for ordinary purposes on a farm.



When Only Approximately Correct Results are Needed, This Strange-Looking "Compass" can be Used in Measuring Distances and Estimating Areas

F. J. Davis, Barton  
1215 Av. B, East,  
Hutchinson, Kan.

Ed. Reaney, R. F. S. (Kearney)  
Bellevue, Mo.



3481 Car. Schott  
109 N. Saratoga St.  
Baltimore, Md.



Five Rings in Rare Design: The Mountings are Formed of Silverized Sea Growths, While the Settings Are Submerged Pearls That Appear Convex but Are Really Perfectly Flat

## MARINE DESIGNS IN JEWELRY AND NOVELTIES

By RUTH K. RICE

**I**N the making of artistic novelties, a craftsman of Baltimore uses real shells, coral, or some other product of the sea. Each piece is unique, since nature fashions no two things exactly alike, and each must be constructed as the material at hand allows.

This artist's studio is a most interesting place, for in it are gathered together from all parts of the world many unusual specimens as well as quantities of the well-known varieties of the shell family. Among



A Sea Urchin and a Little Sea Horse, Treated by Electricity to a Bath of Silver, Make This Candlestick

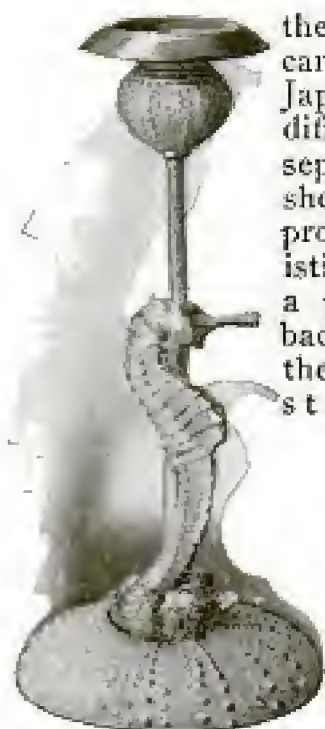
them are marlinespikes from India, mottled brown and cream shells that resemble the sailor's tool of that name. From the Mediterranean come turban shells, marked like a grouse's back. Rainbow-tinted abalone and translucent pearl shells occupy a corner of their own.

There are also tantalizing submerged pearls that appear to be convex and are in reality perfectly flat. These are often set in rings or pins between two tiny snail or clam shells coated with silver. For similar uses are



Left: A Small Loving Cup Made of Two Silvered Urchins and Some Luck-Bringing Sea Horses. Center: A Shell Loving Cup; the Bowl Is a Superb Chambered Nautilus. Right: A Unique Spoon, Having a Pearl-Shell Bowl and a Sea Horse Mounted on a Silvered-Coral Handle





A Candlestick Made of Sea Urchins, a Sea Horse, and Bits of Coral

bunches of cherry blossoms or wistaria, flying birds, or other designs.

As each new article is to be made the possible materials are assembled. These are combined and rearranged until a satisfying result is obtained, which is photographed for a working design. Then silver is deposited by an electrical process wherever it is wanted. Sometimes the entire shell is covered with the metal, without destroying any of the natural markings. Again only a back or a latticework of silver is needed to render the article substantial. The union of the parts is also effected by electricity.

The large prickly sea urchins are transformed into sugar bowls or powder boxes. The upper section is sliced off for a cover, to be lifted by a tiny snail shell. Both parts are treated to a bath of silver and given a French-gray finish. Small urchins conceal inkwells or are combined in various ways to

make candlesticks. Sometimes a silvered sea horse forms the handle, and again one of these weird beasts reclines against a coral rod that supports a cuplike urchin just the right size to hold a candle.

Loving cups made of shells are most appropriate trophies for yacht races and water sports. A handsome one recently presented was composed of 23 shells. Five large British scallops of pinkish tint surrounded a silver-gilt

bowl that would hold three quarts of liquid. Smaller shells filled the intervening spaces. It rested on a silvered urchin upheld by three polished marlinespikes. The base was another urchin surmounted by a group of rare shells.

But the wonderfully beautiful colorings can only be appreciated when shells are used as shades to conceal electric bulbs. Pieces of pearl shell, cut thin and highly polished, are arranged to simulate the petals of lotus blossoms. One such flower completed by a gracefully arched lily stem of dull silver makes an ornamental



The Lotus Electrolier: The Base is Composed of Three Scallop Shells and Three Marlinespikes, from Which Rises a Gracefully Arched Lily Stem of Dull Silver, Ending in a Single Lotus Blossom with Pearl-Shell Petals



The Back of a Shell Tray: It Has a Latticework of Silver to Which are Attached the Silverized Coral Legs





In the Lower Picture the Orchestra Pit has been Dropped from View into the Position Shown at the Right, Where It is Seen About Halfway Down the Shaft

desk light. Several blossoms peeping over the edge of a copper bowl, to be suspended from the ceiling, will brighten a whole room. The artist has also arranged attractive shades of four or six scallop shells. As nature conveniently supplies these in a variety of colors, they can be had to harmonize with the color scheme of almost any room.

### ELEVATOR ORCHESTRA PIT USED IN MOVIE HOUSE

One of Los Angeles' many photoplay houses has lately installed a disappearing orchestra pit which enables the musicians to make their appearance and departure en masse without clambering through the tiny hatch beneath the stage and thereby occasionally distracting an audience. A platform on which a piano, a number of chairs, the music racks, and the traps are arranged in the conventional manner, is raised and lowered by elevator mechanism of the plunger type. The members of the orchestra take their places at the basement level. The machinery does the rest, lifting the platform and its occupants to the curtained-off area in the

auditorium, immediately in front of the stage. The device was installed at a cost of about \$1,500, and the expense of operating it has been found very moderate.

### SIMPLE DEVICE FOR SEALING ENVELOPES

A simple labor-saving device for an office is an envelope sealer which does



away with the use of insani-tary sponges, and the like. With it one person can seal as many as 50 letters a minute. The sealer is provided with a handle about the length and diameter of a fountain pen. To this is attached the member that moistens and seals the flap of the envelope, and in it is a narrow slit into which the flap is inserted, where-upon the single operation of drawing it from one end of the envelope to the other, serves to wet the gum and press the moist edge against the body of the letter. There is little in the device to get out of order.

Baker Iron Works  
Los Angeles

Kendall Specialty  
1270 Broadway  
Copyrighted material  
N.Y.C.



## MEMORIAL SHAFT ERECTED TO UNSUNG HEROES

At the Princes Pier Head in Liverpool, a granite monument has been erected in memory of the valiant deeds of the engine-room heroes of the British navy. In addition to the interest the memorial attracts as a work of art, it is notable for two things. It is one of the very few shafts that have ever been raised anywhere in honor of the many courageous seagoing engineers, mechanics, and coworkers who have stuck to their posts in the face of death and performed their duties

with self-sacrificing patriotism equal to that of any soldier or sailor. The other noteworthy point is that the memorial is the only important English work of its type that has ever been executed solely in granite. It is 48 ft. in height and consists of an obelisk surmounting a heavy base, on two sides of which are sculptured groups representing the different divisions in the personnel of an engine-room staff. The other two sides of the rectangular support carry inscriptions. At the corners of the top part of the base are four figures symbolical of earth, air, fire, and water. Behind these figures and supposedly supported by them is a sea-circumscribed globe, on each side at the back of which a flaming sun is visible. A group of lightly draped feminine figures, holding wreaths, crown the shaft, which at the apex is surmounted by a fiery torch.



COPYRIGHT, STEWART GALE, LIVERPOOL

On Two Sides of the Base Are Sculptured Groups Representing the Different Divisions in the Personnel of an Engine-Room Staff

## STORAGE-BATTERY TRACTOR TO DISPLACE HAND TRUCKS

A small storage-battery truck is now being made for indoor and platform hauling which greatly reduces the cost of handling freight, or other material, and is designed especially for large manufacturing or wholesale plants. It is used as a tractor



MR. W. GOSCOMBE JOHN, R. A. SCULPTOR

COPYRIGHT, STEWART GALE, LIVERPOOL

This Memorial, the First Important English Work of Its Kind to be Executed Entirely in Granite, has been Raised in Honor of the Engine-Room Heroes of the British Navy





Three-Wheel Storage-Battery Tractor Designed to Haul Trailers in Warehouses, and the Like: With One of These Trains a Few Men can Do Work Which would Require a Large Gang If Hand Trucks were Used

and can draw four or five loaded trailers. The truck has three wheels and is equipped with an automobile steering wheel and a worm-gear drive. Its short turning radius makes it adapted for use on freight-depot platforms and in storerooms where there is limited space in which to move about. A few men and a train, composed of one of these tractors and several trailers, can do the work which otherwise would require a large gang of men using hand trucks. It is claimed that in some cases this storage-battery tractor will pay for itself in a few months.

*Walter Janis*

#### LUMBERMEN'S METHODS USED IN FELLING STANDPIPE

When it became necessary some time ago to remove a 110-ft. standpipe at Hampton, Ia., which for a quarter of a century had served as a reservoir for the municipality's water supply, the task was accomplished in a manner closely similar to the felling of a giant tree. The big steel tank stood in the central part of the city before a public building and immediately adjacent to a street. A safety zone was established, traffic suspended, and the work accomplished quickly. A cable was attached to the upper part of the structure and one side of the foundation removed. A

heavy, steady pull on the steel rope did the work. The tank tilted in the direction the cable was stretched, wavered for a fraction of a second, then crashed with a resounding roar into the street,



After One Side of the Foundation had been Removed, a Steady Pull on a Cable Attached near the Top of the Structure Caused the 110-Foot Standpipe to Crash into the Street

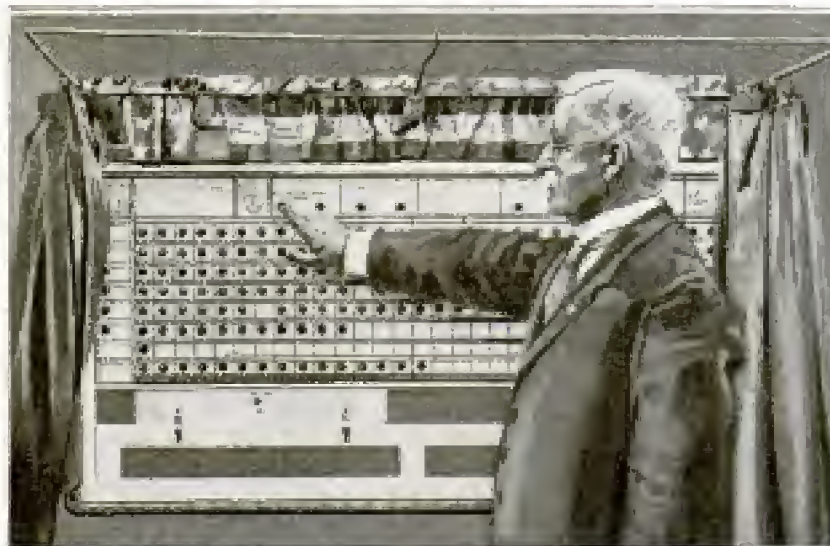
almost exactly in the position that had been contemplated. The work was witnessed by a large crowd of onlookers that jammed the near-by streets.



*Judge Hiram B. Swartz,  
Wooster, O.*

### NEW VOTING MACHINE USED IN CLASS ELECTION

When the students of an Ohio college voted recently for class officers,



Australian-Ballot Voting Machine, the Invention of an Ohioan, Recently Used by College Students to Elect Class Officers

their ballots were recorded and counted by a voting machine of new design. Two students had charge of the ma-

chine and reported the result of the election within three minutes after the polls were closed. The new machine, which has been patented, is the fourth model made by the inventor, who has been working on the problem for 15 years. It is constructed entirely of light material, almost all aluminum, and is housed in an aluminum case, 2 ft. high, 10 in. deep, and from 4 ft. long to any greater length required by the ballot. In operation, an official ballot is fastened on the face of the machine, within a booth, the ballot being perforated to fit over push buttons which appear above the names of the candidates. The voter casts

his ballot by pushing the buttons of his choice and the mechanism does the rest.

3093

### WATER MAINS OF WOOD PLACED OVERHEAD

A strange example of waterworks engineering is to be found in central

is conveyed from an elevated storage reservoir to various parts of the city through square wooden pipes which serve as water mains. Instead of laying these in or on the ground, they are elevated above the streets in many places, so that pedestrians, animals, and even the street cars, which are not large, can pass under them. Another unusual feature of this water system is that these pipes pass right through houses and places of business in a seemingly very hit-or-miss fashion. It is said that the inhabitants were so glad to have the water brought to them that they were



Street Scene in City of Uruapan, Mexico, Showing Square Wooden Water Main Which is Raised Several Feet above Ground and Penetrates the Houses on Either Side of the Thoroughfare

Mexico in the picturesque city of Uruapan, state of Michoacan. Water

willing to put up with the inconvenience of the pipes.



3439

Football

# SETTING THE STAGE FOR ARMY AND NAVY GAME

66, 76, 417 5th Av. N.Y.C.



Plowing through New York Harbor past the Statue of Liberty, the Advance Guard of the Atlantic Fleet Coming in for the Big Event, the Annual Army and Navy Football Game: Following the "New York," Which Heads the Procession, Are the "Texas," "Oklahoma," "Connecticut," "Florida," "Utah," and "Wyoming"

One of the Time-Honored Ceremonies Observed Before the Whistle is Blown for the Kick-Off: The Firing of the Salute. Here, before a Thrang of 50,000 Expectant Rooters, All is Ready for the Cannon to Speak



Future Officers of the United States Army, West Point Cadets, at the Polo Ground, before the Opening of the Hard-Fought Gridiron Battle with the Middies from Annapolis, Who Went Down to Defeat after Putting Up a Spotty, Determined Fight for the Honors of the Day



*Frank H. Woodward;*  
*Go Chalmers Motor Car Co.,*  
 216 3405 **POPULAR MECHANICS**  
*Los Angeles.*

## CAR'S FUEL CONSUMPTION SHOWN BY SPECIAL GAUGE

In view of the high price of gasoline the amount of fuel which an automobile consumes is becoming an increasingly im-



portant consideration in the purchase of a car. Accordingly an automobile salesman in Los Angeles has constructed a device which enables him to show conclusively just the amount of fuel his car will use in a given distance. It consists of a  $\frac{1}{2}$ -gal. gasoline tank

and a glass gauge which are attached near the windshield, in full view of the passengers, and connected with the carburetor into which the fuel feeds directly. The salesman claims that the make of car he sells will travel 18 miles on a gallon of gasoline. To prove this he has marked off the gauge into nine equal parts, each equivalent to a mile of travel, according to his claim. By comparing the gauge with the distance covered, anyone can ascertain if the fuel consumption of the car is as stated.

## AIRMEN NOW HAVE SUPPORT OF MOTORCYCLE CORPS

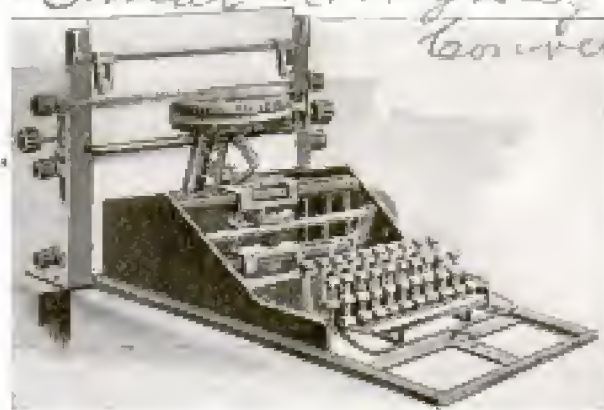
Fourteen high-powered motorcycles, each with sidecar equipment, have been purchased by the War Department to form an auxiliary arm of the aviation corps. Among other uses, they are employed to transport mechanics quickly to different points when aeroplanes, because of mechanical trouble, have to make forced landings. They are also used for rushing supplies relatively short distances. Each ma-

chine is enameled an olive-drab color of somewhat lighter shade than other cycles in the army service, and bears the insignia of the aviation section. They have been assigned to the fliers now at the Mexican border.

## 3330 TYPEWRITER MARKS BOXES OR PACKAGES

A typewriter of new design for marking or addressing packages and boxes by writing directly upon them, and also for printing bulletins or show cards in various sizes of type, has been produced by an Indiana inventor. The platen furnished with the machine has a flat surface and is mounted detachably behind a type wheel carrying both upper and lower-case letters and operated by a set of keys similar to those of the standard keyboard. The flat platen comprises an arrangement for holding and moving paper or cardboard to be written on, and also for line spacing. When a package or box is to be addressed or marked, the regular platen is removed from its supporting platform, which resembles a camera stand, and the package or box is set in its place, being raised sufficiently by a foot lever to bring that portion on which it is desired to write into the proper position behind the type wheel. By the use of wheels of different sizes, which the design permits, it is possible to write in characters varying greatly in size and style.

*\*Omar M. Higley*  
*Converse Ind.*

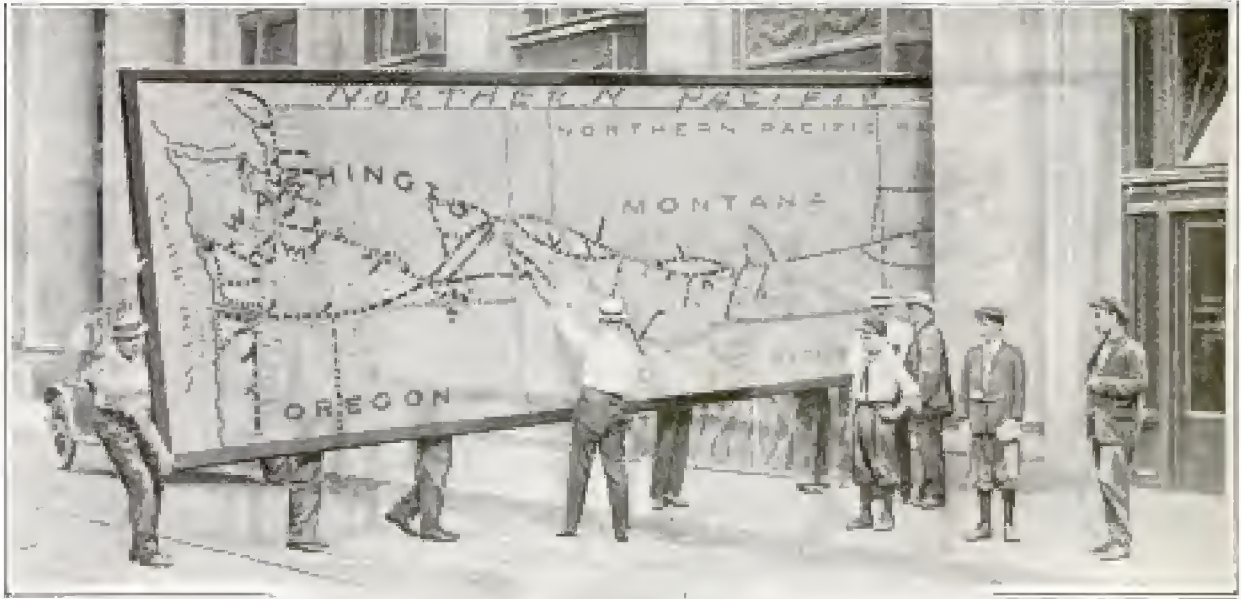


Boxes and Packages may be Marked or Addressed by Writing Directly on Them with This New Typewriter: The Surface to be Written On is Placed behind the Type Wheel in the Position Occupied by the Removable Platen Seen in the Photograph

*Hershey Mfg Co.*

*Springfield Mass*





One End of a Big Map of the States of the Northwest, Which has been Installed in the Immigration Department of the Northern Pacific Railway Offices at St. Paul

### RAILWAY MAP SIXTY-NINE FEET LONG

A railway map of enormous size was recently installed in the immigration department of the Northern Pacific Railway offices in St. Paul. It measures 69 ft. long and 11 ft. wide and required the services of nearly a dozen men to carry it. The map shows that portion of the United States between the eastern boundary of Minnesota and the Pacific coast, and the entire Northern Pacific Railway system, including practically every station on the line. The whole representation is done on such a large scale that even the lettering used in the names of the smallest towns can be easily read several feet away.

### TRAIL-MEASURING WHEEL USED BY FORESTERS

A front bicycle wheel, equipped with a suitable handle and a cyclometer, is now employed in a number of the national forests of the West in measuring trails. There are about 22,000 miles of trails, old and new, in these reserved areas, and it is the aim of the Forest Service to measure many of them and mark them with mileposts and other signs. The cyclometer registers miles

and tenths of a mile. The wheel is fitted with a cushion tire so there is no danger of punctures. One ranger pushing this simple outfit through the forest can measure more trail in a day than two men with a surveyor's chain.



A Bicycle Wheel Equipped with a Handle and Cyclometer, with Which a Forest Ranger can Measure More Trail in the Same Time, than Two Men with a Chain, and can Do It More Accurately

# A. G. Jackson # 18 Jan 1914 # 14 do., Portland, Oregon.



### POLICE USE CORRIDOR AS REVOLVER RANGE

A long basement corridor, bounded on either side by brick walls, has been



Basement Corridor Fitted Up as a Revolver Range, at a Cost of \$35, by the Police Department of Salem, Massachusetts

fitted up at small expense by the police department of Salem, Mass., as a revolver range. The total cost of making the alteration was but \$35. Because of its convenient location the members of the force have found it easy to keep up their revolver practice. The target end of the corridor was covered with sheet iron over which planks were placed to prevent the bullets from rebounding. The lights were protected with sheet iron also. A plain wooden counter serves to hold the revolvers when they are not in use. When a marksman desires to inspect the target closely it can be drawn nearer on a wire which is stretched from one end of the gallery to the other. The use of this corridor suggests the possibility of similar improvements in other police stations.

### HARVEST SWEET-CLOVER

#### SEED FOR USE IN WEST

CHICAGO TRIBUNE 10-7-16

About 200 bushels of sweet-clover seed were obtained last fall by threshing great quantities of sweet clover which grew on the clay banks of the Chicago drainage canal. This seed is to be used for experimental purposes in an attempt to revitalize the soil of large western tracts used for grazing. It is now generally recognized that sweet clover has nutritive value comparable to that of clover and alfalfa and that animals develop a keen appetite for it. It will thrive in many places where neither alfalfa nor clover will grow. The hope is that by planting the sweet clover on western cattle ranges, their value as pasture land can be greatly increased. In addition to being a good forage crop this plant has blossoms which afford an abundant supply of honey for bees.

3381—*Harvest*

### HOUSE IS BUILT OF STRAW

#### BY WESTERN FARMER

*Elmer Randle*

Bales of cement-covered straw were used some time ago by a Logan County, Colorado, farmer in constructing the walls of a six-room dwelling. The house is 48 by 18 ft. in size and has the exterior appearance of a concrete structure. The bales were laid in the same way as if they were stone blocks, and then cemented over, inside and out, pebbles being added with the final exterior coat. A sufficient number of windows for adequate light and ventilation were fitted in the thick walls and a shingle roof raised. Also the inside walls and the ceilings were plastered. Although crude and somewhat reminiscent of the old sod houses of the Kansas plains, it serves its purpose and is a warm, dry shelter which, if left undisturbed, may stand for years. It cost only \$270, exclusive of the labor.

Hereafter the Naval Radio Service will be known as the Naval Communication Service.



Wm. A. Sloan,  
Ss. Pasadena,  
3030 Calif.

## DRUG THIEF IS CAPTURED BY ELECTRIC TRAP

Becoming aware of the fact that some habitual drug user was systematically helping himself to morphine tablets kept on a shelf in the prescription department of his store, a pharmacist at South Pasadena, Calif., realized that he might find it difficult to explain the discrepancy in his records to the satisfaction of the authorities. Therefore, instead of concealing all the bottles of the drug so that they could not be found by outsiders, he constructed an electric trap. He did this by devising a spring switch on which he placed one vial holding a dram of morphine. The other bottles were hidden. The switch was connected with an electric buzzer and so arranged that when the bottle was lifted the circuit would be closed. The scheme worked perfectly. While attending to the wants of a customer shortly after

the trap had been set, the druggist's apprentice heard the buzzer. Stepping quietly to the prescription room he found a well-dressed young man of a prominent family with the morphine bottle in his hands. Since the youth



Devising a Simple Electric Trap, a Pharmacist at South Pasadena, California, Easily Caught a Drug User Who had been Systematically Stealing Morphine Tablets from the Shelves in the Prescription Department

was well known and considered beyond reproach, it had been an easy matter for him to stroll back of the partition and reach the vials on the prescription shelves without exciting suspicion or attracting particular notice.

3345 Railway Review 9-30-1916

## GREAT POWER PROJECT FOR BIG HORN CANON

Big Horn Canyon Irrigation & Power Co., Hardin, Mont.

When a settler in the Big Horn Valley of Montana a few years ago dreamed of harnessing the turbulent waters of the Big Horn near the point where they break from a mighty cañon into the broad valley, so as to convert their power to the use of man, his dream was ridiculed in the locality as a fantasy and its realization counted among the impossible. Today the project of that dream is under way, and the building of a huge dam, 480 ft. high, in a narrow gorge of the Big Horn Cañon is promoted with great activity by a power and irrigation company having headquarters at Hardin,

Mont., with the dreamy but practical and far-sighted settler at its head.

The enterprise includes a hydro-electric plant of large output, estimated at not less than 217,500 hp.; the irrigation of approximately 100,000 acres of fertile, high-level bench lands, now without water, and the construction of a railway, 68 miles in length, which has been located from Hardin south to the dam site and north to a point near Custer, on the Northern Pacific. The southern part of the line will be used for hauling materials for construction of the dam and power plant.

Big Horn Cañon is a natural won-





View to the Eastward from the Rim of the Big Horn Cañon, Montana, Showing Six Miles of the Apparently  
in the Distance. Few Men have Navigated the River.

der—a chasm 1,000 to 3,000 ft. in depth, cut in solid rock by the rushing Big Horn River. Its length, following the river, is 49.7 miles. For much of this

distance the cañon walls stand vertical, and in some places they actually overhang the river. It is a true box cañon, with miles of the most beautiful cañon



This Shows the Site of the Proposed Dam across the Big Horn Cañon, Looking Upstream: The Length  
of the Crest, as Indicated by the White Dotted Horizontal Line, will Be 1,900 Feet

PHOTO BY A. L. RIVEN





Peaceful, but Really Turbulent. River and Eight Miles of the Cañon. Bull Elk Cañon is Seen to the Right but It Is Soon to be Harnessed for Man's Use

scenery in America. Surveys for the dam and railway project have been difficult, as few white men have ever made the entire trip through the cañon,

and a trail had to be cut, in some places with great labor, for a distance of 22 miles, where the rapids of the Big Horn River are most dangerous.



Horseshoe Bend, One of Nature's Many Marvels in the Cañon of the Big Horn; The River Is 200 Feet Wide at This Point and the Photo was Taken from an Elevation of 3,000 Feet above the River



The site selected for the big dam is a point five-eighths of a mile from the lower end of the cañon. Here the river flows between towering cliffs of limestone rock, rising one after another to a total height of about 900 feet. The top of the dam will reach a point about halfway up the higher rows of cliffs; the length of its crest will be 1,300 ft. At low-water stage the river at the dam site is 100 ft. wide and 15 ft. deep. The dam contemplated, according to the *Railway Review*, will be of the circular-arched gravity type, 716-ft. radius, built of solid rubble concrete. The thickness at the bottom will be 322.8 ft. and the estimate of material required to construct it is 1,480,000 cu. yd. of concrete. In height, 480 ft., it will be the greatest in the world. Solid foundation is easily reached in the rock under the channel, however, and the

engineering problems of construction are said to be simple.

The reservoir formed by the project will extend the whole length of the Big Horn Cañon above the dam and seven miles beyond. The storage capacity, to a level 435 ft. above low water, has been computed at 36,143,749,280 cu. ft. The power plant is expected to develop 217,500 hp., figured at 80 per cent efficiency at the turbines and a load factor of 50 per cent; while for eight months of the year this output probably could be doubled. The cost of the dam, including that of the railway from Hardin to the site, a distance of 37 miles, is estimated at \$12,107,000. The power developed is expected to be used by railroads after electrification, as well as by neighboring towns and rural districts for electric-light and other purposes.

3206

### NEW JERSEY POSTMASTER'S FISHING PLATFORM

*Am. Press & Opn.*

When time hangs heavily on the hands of a certain postmaster in New



New Jersey Postmaster's Private Fishing Platform in Rear of the Post Office, from Which He Catches Eels When Business is Slack

Jersey, whose store and post-office building stand on the high bank of a fishing stream, he manages to make the moments pass very agreeably by casting a line into the Peckham River from a little platform which he has built at the rear of the post office. From this point of vantage he is able to return immediately to his postal duties whenever a resident calls for his mail or for stamps, while when trade is slack he can catch in comfort the eels with which the river abounds. It is said locally that there will be numerous applicants for this postmaster's job whenever a vacancy occurs, but the present incumbent asserts that so long as the fishing is good he will continue to handle the mail.

*Examiner—2876*

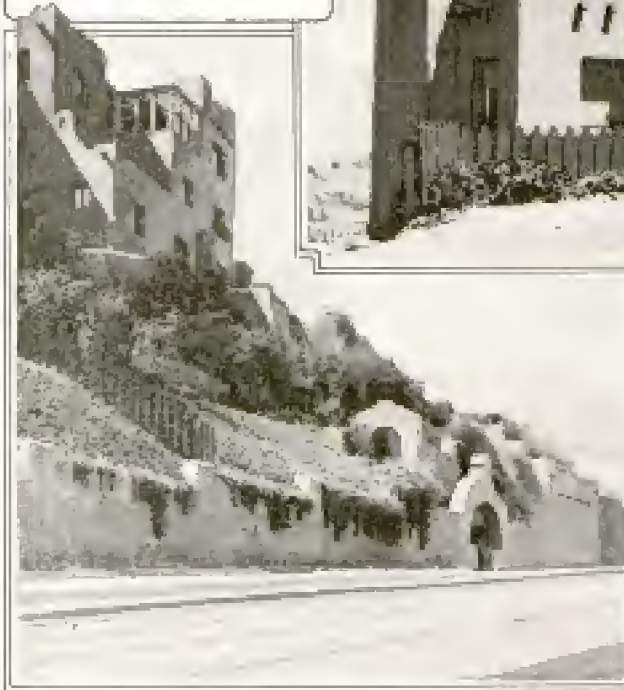
### HOUSE OF PUEBLO STYLE BUILT ON STEEP SLOPE

A dwelling, which almost seems to hang on the side of a steep cliff, is an unusual architectural feature found not far from San Francisco. The west front of this peculiar house faces a street which is nearly 100 ft. higher than the street on which the east front faces. For a dwelling of the ordinary type

*# Monroe Woolley  
2306 Union St. Apr. 6,  
San Francisco*



A View of the West Front of an Unusual House is Shown on the Right, Facing a Roadway Nearly 100 Feet Higher than the Street on Which the East Front Faces. The East Side is Shown Below



There Is Little in This View of the Residence, Which One Gains from the Upper Roadway, to Suggest That It is Built So as to Face Both a High and a Low Level

this almost perpendicular lot would be practically valueless, but in this case the architect has skillfully adapted the now popular Pueblo Indian style of architecture to the precipitous cliff and has produced a pleasing effect. The materials used are stucco and concrete. From the upper windows a magnificent panoramic view is obtained of the greater part of San Francisco, the bay, the cities across the bay, and the mountain range beyond. On the lower side retaining walls and shrubbery have been employed to good advantage to break the abrupt aspect of the slope. Steps mount to the entrance on this side, by easy inclines.

3391 —

#### GATE DESIGNED TO GUARD DRAWBRIDGE APPROACHES

A model of a gate, designed especially to guard approaches to drawbridges when the latter are open, was exhibited in Boston recently, soon after a carload of people were plunged to their death because an open bridge had been left unguarded. The gate

is strongly made and is hinged to a heavy post. At the swinging end is a cable used in locking it across the car track. The cable is fastened to a series of bolts beneath the pavement in such a way that when a car strikes the gate the impact, if violent, will break one after another of these bolts and gradually bring the car to a stop. For a swiftly moving conveyance of any kind to strike an immovable barrier would be sure to result in an accident, but with this arrangement the violence of a shock is lessened by means of the bolts.



Model of Gate to Guard the Approach to a Drawbridge: When the Gate is Closed It is Fastened to a Series of Bolts beneath the Pavement in Such a Way That a Car Striking It is Brought to a Gradual Stop

*H. Geo. A. Fraughton Co. The Post, 259 Wash'n St., Boston.*



## UNUSUAL VIEW OF GREAT CANTILEVER BRIDGE

The accompanying illustration gives an unusual view of a portion of the great Queensboro bridge in New York



An Unusual Photograph of the Queensboro Bridge, New York City, Which Suggests the Bigness of the Structure in a Striking Way

City, and conveys to one, better than many more conventional photographs, a sense of the magnitude of this engineering feat. It shows clearly the double-deck construction of the bridge. From the rail at the left one can look down on the trolley track and through its openwork floor are visible, far below, the ground, and the waters of the East River. Above the rail rise the great steel beams of the cantilever framework.

At the request of the Canal Zone authorities the Bureau of Fisheries, by way of experiment, has stocked Gatun Lake with several hundred black bass, rock bass, catfish, and sunfish. If the fish thrive, doubtless many more will be added.

## COIN-OPERATED SODA 2171 FOUNTAIN

An automatic soda fountain has been patented by a resident of Houston, Tex., which is operated merely by dropping the proper coin into a slot. Contained in an attractive wooden cabinet are three tanks, one filled with sirup, another with carbonic-acid gas, and a third, which is surrounded with ice, is filled with water. There is also a container filled with paraffined cups. When a coin is dropped into the slot it releases three delicately balanced levers, one after the other. The first allows a cup to drop from the container into an opening, where it is within reach of the customer, and beneath two spouts. When the coin passes the next lever it releases a spring-operated apparatus that allows the proper amount of sirup to flow down into the cup. The third lever operates in the same manner as the second and allows a little less than a cupful of iced carbonated water to flow into the cup. In this way



Coin-Operated Soda Fountain Which Automatically Mixes Soda Water in a Sanitary Cup and Places It within Reach of the Customer

the drink is properly mixed in a sanitary way and supplied to the customer without human aid.



## PRICE LIST

PRECISION KEY MACHINE (including one bevel edge cutter and one 18 gauge square edge cutter with corresponding guide discs) complete with hand crank.....\$20.00

Combination hand crank and power wheel, instead of simple hand crank, supplied on request without extra charge.

Weight packed for shipment 15 lbs.

---

Extra bevel edge cutter (for all pin-cylinder-lock keys) ..\$2.00

Extra bevel edge guide disc.....25c.

Extra square edge cutter (any thickness from 14 gauge to 20 gauge). For all cabinet-lock keys, or keys with square notches.....\$1.00

Extra square edge guide disc (any thickness from 14 gauge to 20 gauge).....15c.

Complete set square edge cutters, with corresponding guide discs, consisting of 6 square edge cutters and discs, 14 gauge, 15 gauge, 16 gauge, 17 gauge, 19 gauge and 20 gauge. (18 gauge cutter and disc come with the machine).....\$6.00

Extra hand crank.....\$1.00

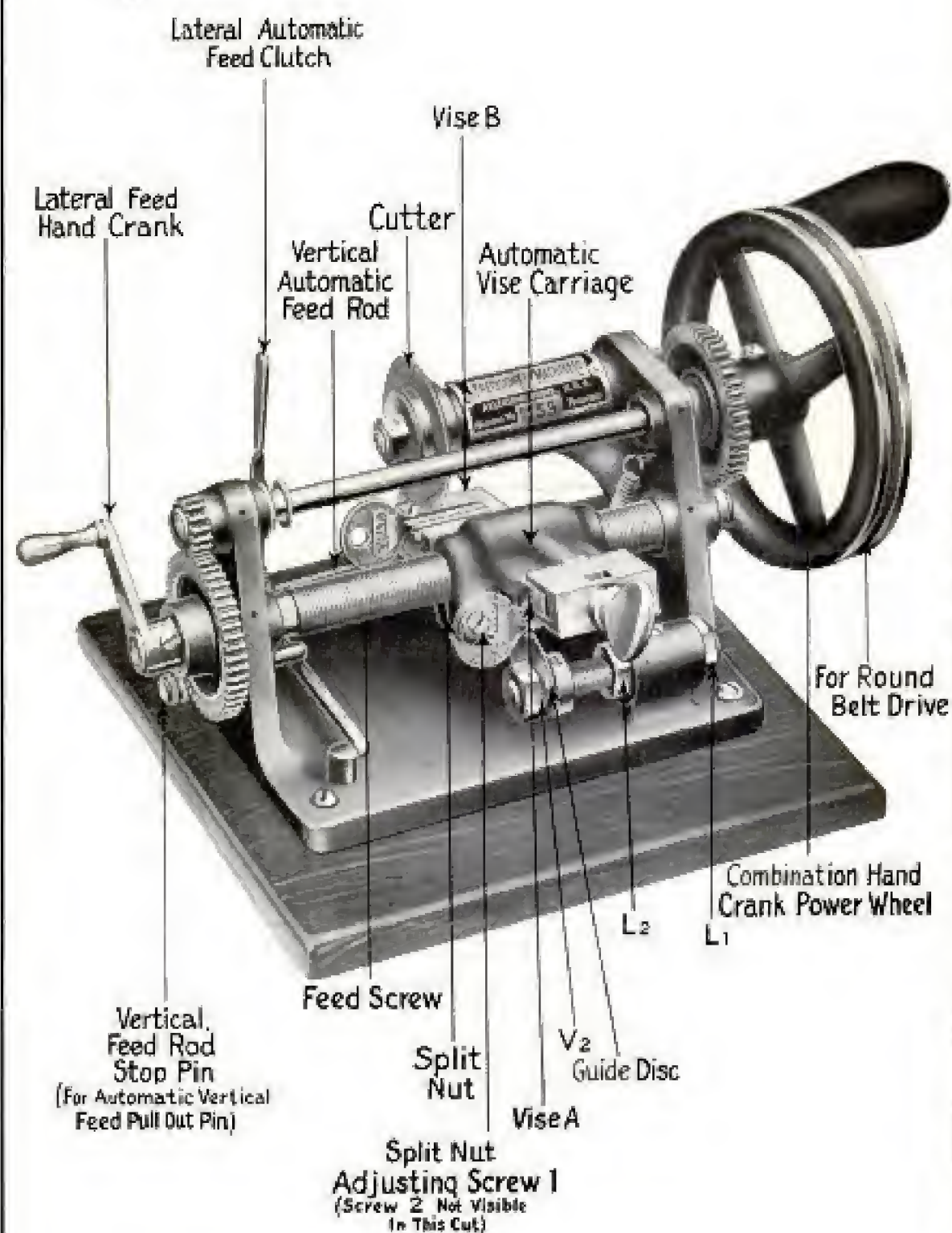
Extra combination hand crank and power wheel.....\$1.00

## WARRANTY

Every PRECISION KEY MACHINE is guaranteed. It must do the work for which it is intended. Each machine is tried out before it leaves the factory and is in perfect working order when sent out. Should defects in workmanship or material appear, we stand ready to promptly make them good.

PRECISION KEY MACHINE CO.









Each Animal has been Taught to Mount His Platform as Shown Above. In Some Cases Instruction has Begun at an Early Age, as Indicated at the Right

Two of a Herd of Trained Guernsey Steers Doing One of Their "Stunts"

### GUERNSEY STEERS TAUGHT TO PERFORM

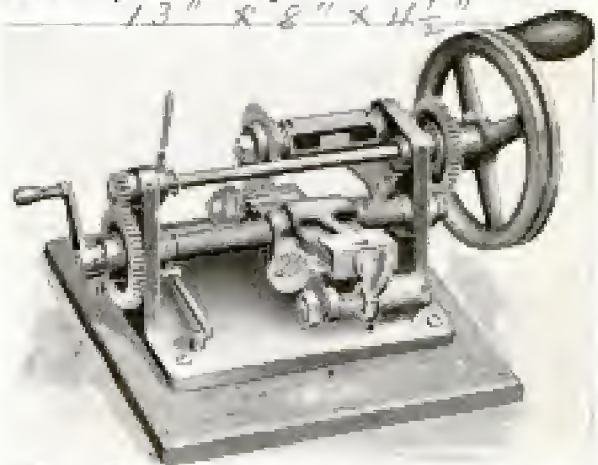
*Henry Freeman*

A man in West Brookfield, Mass., has done an unusual thing in the line of animal training by teaching a herd of Guernsey steers to do tricks, thereby showing that cattle, which commonly are thought to have a rather low grade of intelligence, can be made to act for exhibition purposes the same as horses can. Individual platforms of heavy planking have been constructed for these animals and each has learned to take his place, just as trained dogs mount their stools. Another of the acts which has been taught these animals is to roll a barrel along the ground by pushing it with the nose.

smiths. This device is a carefully designed machine tool built to cut duplicate keys accurately from originals. It will duplicate any Yale-lock key from either an original or a pattern, no

matter what the make may be, and will also cut flat cabinet-lock and other keys having square-bottomed bits. In operation, the pattern or key to be duplicated is placed in one vise, the blank in another, and when firmly clamped in place, a cutter, mechanically guided, cuts a perfect duplicate in less than a

13" x 8" x 4½"



There Is No Waiting on the Locksmith with This Little Machine, Which Cuts a Duplicate Key from a Pattern Inside of a Minute

minute. The machine stands 4½ in. high, is 8 in. wide, and 13 in. long, and is operated by a hand crank or power wheel, a combination of which is furnished if desired.

### DUPLICATE KEYS QUICKLY 3279 MADE BY MACHINE

Filing duplicate keys by hand is a slow process, especially when the key is of the Yale-lock type, which must be cut with extreme accuracy. A better and quicker way is furnished by a small key machine now being used by real-estate and hotel men as well as by lock-

*Precision Key Machine Co., Allen, Town, Maine*



*2417*  
**FOLDING TRUNK IS LOCK  
FOR MOTOR CAR**

To safeguard a car against theft when it is left unattended, and also to provide a safe depository for robes and



When the Trunk is Raised, Tilting Forward the Seat as Shown Here, Operation of the Car is Prevented

other articles at such times, an *Officer* ~~Lowan~~ has invented a folding trunk which, when in use, obstructs the steering wheel in such a way that a machine cannot be driven. The appliance is attached to the cushion of the chauffeur's seat and is normally folded beneath it out of sight. When raised and locked in place, it presses the cushion tightly against the wheel. The trunk is constructed of sheet metal and since its dimensions are 35 by 15 by 15 in. it provides storage space for parcels of fair size as well as wraps. It is hinged to swing forward and give ready access to the gasoline tank and tool box when these are situated beneath a seat.

*3362*  
**RAIL BODY NOT IN FAVOR  
OF "DAYLIGHT SAVING"**

The American Railway Association's committee on standard time has recently made a report on the so-called "daylight-saving" movement, which has for its object the resetting of the clock so that the end of the working period will not approach so near the close of the daylight period. The committee declares that in the event of a nation-wide agitation for the change the railroads should not antagonize the

movement. However, though these men believe that the roads would not suffer serious inconvenience or disarrangement of schedules by the change, they are of the opinion that it is not warranted from a scientific standpoint, and they say definitely that they are not in sympathy with it. The committee feels that the railways should not agree to adopt the scheme until it had previously been adopted by the principal business and municipal centers, together with the state and local authorities. It points out that unless a change such as has been proposed were made on the same date throughout the country, it would lead to confusion and difficulty.

*2961*  
**VACUUM-CLEANING PLANT  
FOR HOME USE**

A vacuum-cleaning outfit which is now being introduced in many homes possesses many of the advantages of larger central cleaning plants used in hotels, etc., but is of simpler construction and is easily installed. Because it draws all the dirt and dust into a receiver, which is ordinarily located in the basement, none of the dust-laden air that passes through the cleaner is discharged back into the room. The machine for home use stands about 40 in. high. Its electric motor operates a low-velocity turbine fan, which produces the vacuum. In the baseboard



in each room in the house is an inlet valve connecting with tubing that leads to the machine in the basement. A system of installing the tubing has been devised which requires but little cutting of partitions, etc. Electric switches on the various floors give the operator convenient means of control. The outfit includes 25 ft. of hose and a cleaning wand with a variety of nozzles.

*Spencer Turbine Cleaner Co.  
Hartford, Conn.  
Copyrighted material*

*General Sec'y, Assoc.  
Am. Ry. & Eng. Co.  
75 Church St.  
N. Y. C.*





A Scene in the Dunes: What Appears to Be Snow Is Sand Which Stretches Limitlessly in Hills and Valleys

**F**ORMING a fringe about a mile wide along the shore and following the curve of the southern end of Lake Michigan for a distance of more than 18 miles is a range of sand hills, known as the "Sand Dunes of Indiana," a name that is familiar to scientists and travelers of all parts of the world. This is the sand-dune country that is now being investigated under an act of congress with the view to making it into a national park. The statement is often

made that the dunes of this district are the largest in the world. This statement is of little importance whether true or not. There may be larger dunes and there may be ranges occupying greater areas, but it is safe to say that no other sand dunes in the world are so widely known for their picturesque features or so highly prized as a field for scientific investigation. Advocates of the plan for making the district a national park argue that such action



A "Forest" Fire in the Dunes: These Fires do Not Travel Far Because the Shrubbiness Is Sparse, but Sometimes They Have Ruined Considerable Areas of the Dune Country





A Panorama of the Dune Country, Giving a Fair Idea of the Size and Profusion

would preserve a natural wonder that is in danger of being obliterated for industrial purposes, and that it would provide a national park where, in contrast with other national parks, there are people to enjoy it. It is less than two hours by rail from Chicago to the dune country.

The only way to appreciate the dunes properly is to tramp through them, but even from a distance they are impressive. Viewed from inland, the chain of sand peaks dominate the country to the north and give the observer much the same impression that is received on looking out of a car window and seeing for the first time the distant mountain barrier of the Rockies. From this it is not to be inferred that the dunes are mountains in any sense. They

are sand hills, and the highest peak among them is barely over 200 ft. in height. Their peculiar scenic value lies in the fact that they reproduce the characteristic features of mountain scenery and give the observer the same thrill and stimulus that is experienced in viewing mountains.

Ages have been required for the formation of the dunes, and they are still in process of formation.

Driven by the north winds that sweep unobstructed across 300 miles of water, the waves break on the south shore with greater force than at other points along the Great Lakes. Each wave, as it spends itself on the beach, leaves its tribute of sand, and this, as it dries, is blown inland by the wind, carried gradually over the barrier



Dogwood in Full Bloom, an Early Spring Attraction in the Dunes





of the Growth Covering It. Lake Michigan is Seen in the Background at the Right

dune that parallels the shore, and is at last deposited somewhere in the tumbled region of peaks, buttes, and cañons that extends a mile or more back from the lake and constitutes the real dune country.

The southern limit of the dune country is a marsh that serves as a definite boundary between the dunes and the so-called "back country," a district broken by occasional sand hills and marshes and having a general elevation only a few feet above lake level. The barrier dune ranges from 70 to 100 ft. in height, and except at isolated points is too steep to be climbed. At intervals there are cañons leading up through the barrier. These are known locally as "blow-outs," a term that suggests the manner in which they have been formed, being

actually blown out by the winds. When the slope of a "blow-out" is climbed, it will usually be found to have a rounded crest of fine sand, and if the wind is strong there will be a mist of sand continually drifting over the crest

and into the shelter of the lee side. Here one sees the process going on just as it did ages before the French explorers tramped through the dune fastnesses. The dunes that are comparatively permanent in form and location are the ones on which tree growth has taken a firm foothold. Some of these, such as Mount Tom, Mount Holden, and Mount Green, have been permanent features of the landscape for generations. Many

of the dunes are continually shifting, the general movement being east and southeast. In this process whole for-



The Beautiful Blue Lupine Blossoms in the Dune Country



ests are engulfed by the sand, to reappear perhaps years later as the sand continues on its journey. No one person knows the entire dune country. There are hundreds of secluded nooks, where grow strange exotic plants, some of them practically unknown.

It is in the study of plant and bird life that the dunes are of the greatest scientific value. The common saying that the dune country is the meeting ground of the plant life of the entire western hemisphere is apparently correct. Cactus from the deserts of the southwest grows side by side with the bearberry from the mountain slopes of Canada. Buried deep in the forests of the oaks that are native to this climate there is occasionally found a tulip tree. At least four kinds of orchids have been found. Many plants native to southern climes may be found along the marsh and in sheltered cañons. How they came there no one knows, but their presence is accounted for in some measure by the carrying of seeds by the migratory birds. One man alone has found and identified more than 200 varieties of flowering plants.

As interesting as the plant life is that

of the migratory birds. Regularly, about the middle of November, the gulls come in flocks with their young and take possession of the beach. Among them are the herring gulls, the ring-billed, and the Bonaparte's gulls. During the day they soar back over the woods and hills, but with the approach of night they return to the water. About the middle of May they suddenly disappear on their long journey to their summer home somewhere near the arctic circle. As the gulls leave, the terns come from the south, those most commonly seen being the Forster's, common, Caspian, and black terns.

A visit to the dunes gives one a feeling of being close to the life that was lived there when the Indians hunted and fought among the hills. Interesting relics are frequently found. Recently the remains of two Indian villages, as well as an Indian trail obliterated in places by the drifting sand, have been discovered. In one of the villages were found three silver crosses such as the French missionaries carried and sometimes gave to the Indian converts.

### 3387 NOVEL AMBULANCE FOR WOUNDED HORSES

An improved ambulance for wounded horses has been invented by a British soldier, and a vehicle built from his plans was recently shipped to the front

in France, for the use of the Blue Cross Society, which undertakes the care of wounded animals. The ambulance is fitted with a reversible body, which turns on a pivot, thus avoiding the necessity of backing the horses out, and has a folding platform at the rear.



The Body of This Blue Cross Ambulance Swings on a Pivot, So That a Horse can Both Enter and Leave by Walking Forward

# Janet M. Cummings, 70 Fifth Ave., N. Y. C.





These Fire Ruins of a Popular Amusement Park Proved a Great Attraction for the People of Cincinnati, Who Paid the Usual Admission Fee to View the Wreckage of Familiar Structures, Indicated by Placards.

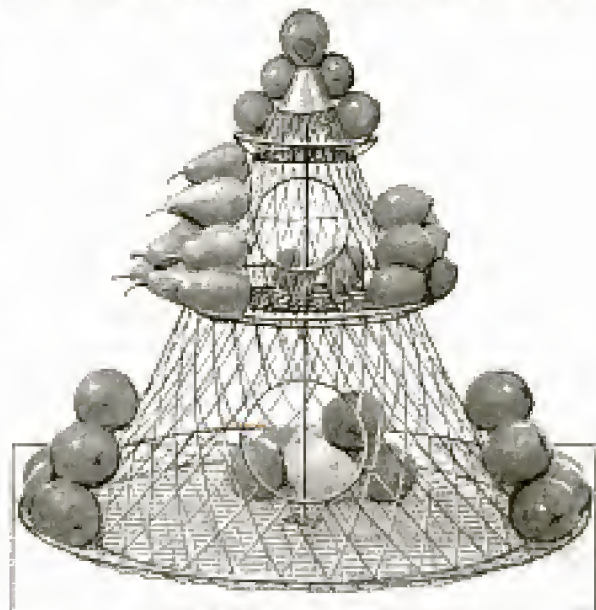
### AMUSEMENT-PARK RUINS PUT ON DISPLAY

*chester* *Public*  
The ruins of an amusement park in Cincinnati, which was recently the scene of a disastrous fire, were turned to good account by a manager who gauged correctly the curiosity of his public regarding the wreckage of a familiar place. The park had been a great popular resort, its buildings familiar to the entire population of the city. When the roadways and paths were partly cleared and signs placed on the ruins of the various buildings and amusement structures, indicating what was left of old landmarks or pointing out freakish effects of the fire, the public cheerfully paid the usual admission fee and swarmed to the place. Temporary fences were constructed where necessary, but the work of clearing and fencing would have been done in any case, so that the enterprising manager's receipts from the show were practically all profit.

### STAND FOR DISPLAYING AND STORING FRUIT

A stand for attractively displaying fruit has been patented recently, which is so constructed that fruit can be taken from it without disturbing the display. The device consists of a conical wire frame, 24 in. high and 27 in. wide at

the base. Around the bottom, middle, and top are wire shelves on which the dealer's stock can be piled so as to make what appears to be a solid cone. In one side of the stand are two large holes which give access to two compartments where surplus stock can be stored. The oranges, apples, or whatever may be kept in here, can be drawn on without disturbing the fruit on exhibition. These compartments will hold about a box and a half of oranges.



Fruit or Vegetable Rack Having Compartments in Which Surplus Stock can be Stored and Drawn On without Disturbing the Display

If preferred the stand can be hung on a hook. It can also be used for vegetables.

*by Edward L. Behring*  
*(Inventor)* *Wyskoff, Allen*



## 3236 FIRE DAMAGES WISCONSIN UNIVERSITY HALL

A fire which recently destroyed the dome of the University of Wisconsin's



Photograph Taken While Fire was Destroying the Dome of the University of Wisconsin's Main Hall. This Fire was First Discovered by Persons in the State Capitol Eight Blocks Away

Main Hall, at Madison, caused damage estimated at \$25,000. Though more than 1,000 persons, chiefly students, were in the building when the fire broke out, clerks eight blocks away in the state house were the first to see the fire and turn in an alarm. The state capitol and the university hall are situated on elevations at the opposite ends of State Street. The dome finally top-

pled over and then the firemen were able to gain control of the flames. Crossed wires are believed to have started the fire. An American flag hoisted above the dome waved for about two hours while the structure burned, and then dropped to the earth uninjured.

## REFUSE BURNER FOR ARMY CAMP

For the disposal of refuse in United States Army camps a convenient incinerator has been devised which has proved efficient. It is easily constructed by troops in camp, from cobblestones or rocks. The bottom of the incinerator is laid with medium-sized stones; the sides and one end

are constructed of larger stones or pieces of rock, banked up on the outside with a sloping wall of mud which holds the stones in position and fills in the crevices. One end, in the direction of the prevailing wind, is left open for draft. The incinerator is made about 3 ft. wide, 4 ft. long, and 1 ft. high. All kinds of camp refuse may be destroyed by burning in these incinerators. Scraps



Camp Incinerator for the Disposal of Refuse. Constructed at the Training Camp of District of Columbia Troops, Fort Myer, Virginia

H R D Beard 50 W. S. A., N. W., Wash., D. C.



from the mess table, garbage including liquids, and waste paper are all burned. Discarded liquids from the mess soon evaporate when poured upon the hot stones. An occasional coat of lime improves the appearance of the incinerator, and is sanitary.

2143

### WASTE-PAPER CONTAINERS MADE OF PALM STALKS

Novel and artistic waste-paper baskets have been made from the flat



stems of palm branches for use in a western park. The lower ends of the stalks are attached to a circular piece of wood, about one and one-half feet in diameter, which serves as a bottom. Around the base of the

container, and also around its middle and top, are bands of wire which help to keep it in shape. These receptacles stand about three feet high and are two feet wide at the top. In the park referred to about 50 of the baskets are in use.

3222

### POWERFUL POLE JACK FOR LINEMEN'S USE

The pulling, straightening, and moving of poles has long been a difficult problem for telephone, trolley, and lighting companies. A new pole jack designed to overcome the difficulty is simple in operation and has a capacity of 15 tons. The jack is pivoted on its base, and the equipment includes a portable, nonslipping I-beam base support, a steel chain, and a steel lever bar. Only one man is necessary in the operation of straightening poles by the use of this jack. In pulling poles, contrary to the usual practice, digging around the base is eliminated. The I-beam base is placed beside the pole and the jack set upon it. The chain is

slung around the pole and pulled tight through a pear-shaped link, and only a



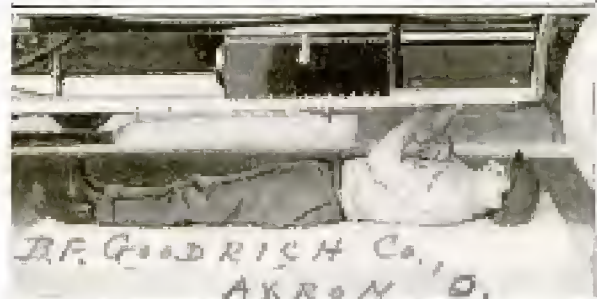
Telephone, Trolley, or Lighting Poles are Pulled or Straightened in a Few Minutes by the Aid of This Pole Jack

few minutes are required to lift the average pole from its place.

3309

### RUBBER BLANKET FOR ROAD OR CAMP SERVICE

INDIA RUBBER WORLD 7/1/16  
Many uses may be found for an automobile blanket of duck, with rubber surface coating on one side, which has lately made its appearance. It comes in one size only, 45 by 72 in., but in two weights, medium and heavy. Folding into a small compact package, it is easily carried under an automobile seat or in the tool box, and in case of trouble requiring a lying position beneath



When a Rubber Automobile Blanket Comes In Handy: When You "Get Out and Get Under" to Fix Trouble beneath Your Car

the car, or when it becomes necessary to change tires in wet or muddy places, the rubber blanket is a friend indeed.

Templeton, Kerlin & Co., Ltd.,  
1020 S. Central Av.  
Chicago.



## NEW RAILROAD PENETRATES GREAT OREGON

## LUMBERING DISTRICT

# STANLEY W. TAPP, 327 McDONOUGH ST., BROOKLYN N.Y.

NO railroad development in the Northwest in the last decade has opened up greater possibilities for the rapid development of that part of the state than the recent completion of a \$13,000,000 extension into the Coos Bay country of southwestern Oregon. Here was an isolated section of Pacific coast territory, possessing a harbor that may some day rival that of San Francisco, and tapping a land rich in timber, minerals, and farm lands, some 400 miles south of Portland. Up to the time that this extension was opened, it had been completely shut off from railroad connection with the rest of the world and was reachable only by sea, or by a difficult overland route through mountainous country by stage from a point on the main line of the railroad into California.

Despite these handicaps, the towns of Marshfield and North Bend, occupying positions similar to San Francisco on San Francisco Bay, grew rapidly in population and prosperity. Thick forests of huge timber in adjacent forest lands made lumbering the chief industry of the bay, with gigantic sawmills convenient to the water. Then there was the pulp business, which in these days of European war has taken on a new importance, and one of the largest mills in the West located itself on the bay. Congress appropriated nearly \$800,000 to the improvement of the bay channel. The agricultural resources of the country, comprising as it did vast acreages given over to many different crops, attracted attention.

So promising was this great territory, that the railroad company, the Southern Pacific, decided to stretch its lines to the bay and end the isolation that had existed for so many years. With a big problem before them, the railroad construction engineers decided to build a spur from the main line at Eugene, although the distance by the "line of least resistance" was at least 120 miles and the mountainous territory brought back recollections of the building of the old Central Pacific near-

ly half a century ago in the early days of the West. There were many rivers to be crossed, mountains to be penetrated, and uncertain, marshy ground to be filled in or trestled.

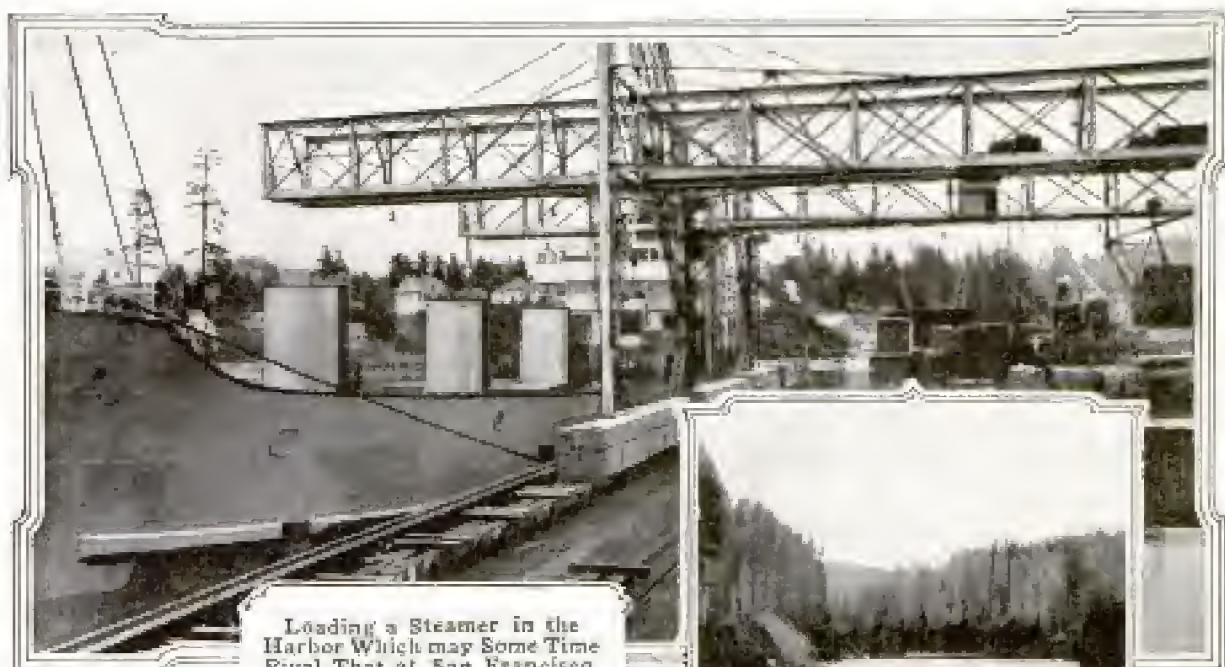
But modern railroad engineering balks at nothing, even removing mountains when necessary. Owing to the lay of the land, the surveyors and engineers decided that the easiest way was to run the spur directly west from Eugene for about 50 miles and turn southwest, gradually approaching the coast and nearly reaching it at Coos Bay. There were the Suislaw and Umpqua rivers and the bay itself to cross, but that could not be avoided. The construction of the line was started forthwith. The result of this work is now apparent and the Coos Bay extension was officially opened last August.

The final completion of the new line into Coos Bay was regarded as a momentous event and the entire section gave up three days to a railroad jubilee and celebration, in which all the people of Marshfield, North Bend, and neighboring towns took part. The chambers of commerce of San Francisco and Portland ran special excursion trains to Coos Bay so that their members could participate in the celebration and look over the new line and the country through which it ran. At different points along the coast, the new line crosses a series of lakes, which abound throughout the coast country.

The exact distance between Eugene and Marshfield by rail is 121.6 miles. To construct the new extension, it was necessary to build many tunnels and bridges, besides the roadbed. In fact, the total length of the nine tunnels is 13,925 ft., while the total steel used in the 31 bridges required was 8,134 ft. Five and one-half miles of trestles were built, while the other supplies used included 18,000 tons of track steel, 9,100 tons of bridge steel, 40,000 yd. of concrete, 50,000 bbl. of cement, and 20,000,000 ft. of Oregon fir timber.

The time required for the trip between Portland and the Coos Bay





Loading a Steamer in the Harbor Which may Some Time Rival That at San Francisco. The New Line Opens a Potentially Wealthy Territory Heretofore Isolated



Reaching through Mountainous Country of Scenic Splendor, the Road Skirts a Series of Lakes Extending for Miles through the Hills



Forty Cars Loaded with Massive Logs Made Up the Train That Officially Opened the Line to Marshfield. It is Estimated That 21,000,000,000 Feet of Lumber Are Available in This Rich District



This Shows a Section of the Bridge Which Carries the Line over the Umpqua River. At Another Point the Siuslaw is Also Crossed



As the Road Nears the Coast and its Terminus, It Crosses Coos Bay. Its Construction Entailed the Boring of Nine Tunnels and the Erection of 31 Bridges and Five and a Half Miles of Trestle



country was cut down perceptibly by the extension. Before the railroad came, it was necessary for the traveler from Portland to take a night train, which would reach Roseburg at 4 a. m., while the stage which left two hours later had a rough "voyage" over the mountains, reaching Scottsburg, a small town, in time to stay all night. Coos Bay was reached the following afternoon. Today the distance can be made by rail in eleven hours. Another significant feature of the extension is that of the freight movement. Heretofore it was possible to send a car from Corvallis, in the same state, to

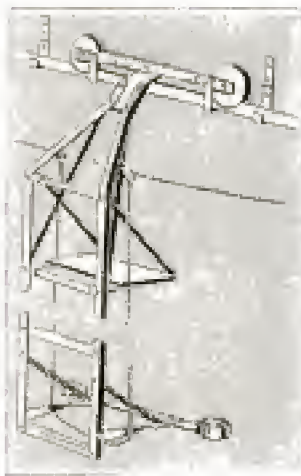
New York in the same time that it took a San Francisco or Portland shipper to get his consignments into Coos Bay. Now Coos Bay receives its freight in two days. Perhaps the most interesting fact about the new country, which is a third larger than the state of Rhode Island, is the immense timber reserves it opens up to the rest of the country. There are approximately 21,000,000,000 feet standing, the larger part of it privately owned. It is chiefly fir and spruce, tremendous in height and girth, and characteristic of the wonderful timber resources so abundant in that section of the country.

2727

### TRAVELING STEEL LADDER

#### IS MADE FOR SILOS

*Silo Specialty Mfg. Co., CLINTON, Ia.*  
As a safeguard against the accidents that occasionally occur when ordinary ladders are used in scaling cylindrical



silos, a western firm is bringing out a traveling ladder designed to be permanently attached to such structures. It is constructed of steel and hung in the same manner as the average barn door, operating along a track at the top and kept in proper alignment

by rollers at the bottom. A rope passed about the silo and through pulleys attached to the ladder, enables the device to be moved to right or left without making it necessary for the user to descend to the ground. Thus painting may be done, or the hoops of a silo tightened, without the worker being in constant danger of falling and seriously injuring himself.

CA maker of articles for little folks is putting out a series of pictures on child subjects, strongly framed and covered with unbreakable "celluloid glass."

3273

### BLISTER RUST RAVAGING WHITE-PINE FORESTS

The white-pine blister rust, a disease for which there is no known cure, threatens to ravage white-pine and other five-leaved pine forests valued at \$260,000,000. The disease has already secured foothold in Canada, New England, and other eastern states, and has appeared as far west as Wisconsin and Minnesota. New York and Wisconsin have established a rigid quarantine to check the spread of the disease, and the agricultural boards of other states are coöperating with various organizations to prevent the transportation of infected pines or disease-bearing bushes. The spores of the blister rust are blown from infected trees to currant and gooseberry bushes, where they germinate on the leaves and then are carried to other pines, often a considerable distance away.

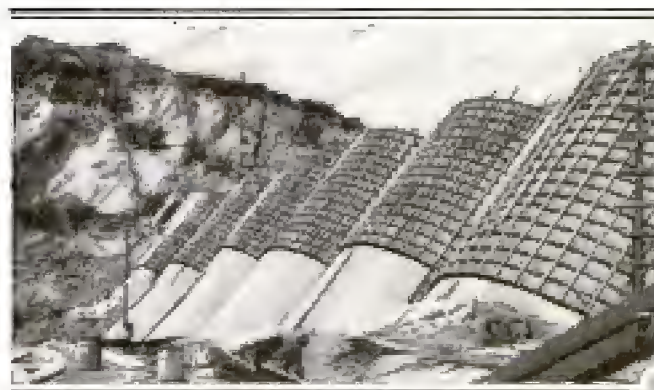
3110

### GREAT MULTIPLE-ARCH DAM DESTROYS WESTERN FALLS

High up in the Sierra Nevada Mountains of central California an electric-power company has erected a dam which is of twofold interest. It is one of the largest dams of the multiple-arch type ever built, and its erection destroys Silver Lake Falls, one of the most beautiful cataracts in the state and one which many citizens en-

*American Forestry Assoc.,  
1410 H. Ave., N.W.,  
Wash., D.C.*





View of the Dam before Its Completion: The Structure Is 680 Feet Long and 70 Feet High, and the Power Plant with Which It is Connected will Eventually Develop 10,000 Horsepower

deavored, without success, to preserve. The falls made a series of plunges totaling more than 2,000 ft., and, as the accompanying illustration shows, at more than one point it spread out over great shoulders of rock in a truly wonderful manner.

The dam which diverts the waters that until a short time ago produced the falls, is 680 ft. long and 70 ft. high, and is composed of 17 reinforced-concrete arches, having a radius of 23 ft. on their upstream face. The first of two units of the power plant has been completed, and its turbines are generating about 5,000 hp. When the second unit is finished, which will be some time next summer, the two will generate 10,000 hp. This dam alone cost \$250,000. One of many great obstacles which have confronted the engineers in carrying out this project has been its distance from the railway. The nearest rail point is 56 miles away. As a first step, the company had to spend \$40,000 in building roads. Over these highways the great bulk of the material was hauled, including 75 carloads of cement.

3314

# PROPELLER OF INTERNED SHIP IS MOSS-COVERED

Interned in Manila Bay are about 16 German merchantmen, aggregating 36,000 tons, which cannot venture forth on account of the war. As they lie there in idleness their sides and also propellers are collecting barnacles and moss, as shown in the accompanying

# Reg. M. C. L. T. H. K., P. O. Box 1345, Manila, P. I.



Silver Lake Falls, Which has been Destroyed by the Completion of a Huge Multiple-Arch Dam That Diverts the Water to Turbines

illustration, which gives a close view of the stern of one of the ships. The vessel evidently is carrying little cargo, for one of the thickly coated propeller blades projects a considerable distance above the water.



Close View of Stern of German Merchantman Interned in Manila Bay, Showing the Growth Which has Collected on the Blade of the Idle Propeller



## AMERICA'S ATTRACTIVE COUNTRY CLUBHOUSES



Imposing Home of Blue Hills Golf Club at Kansas City, a Fashionable Playground within Corporate Limits. The Immense Building is of Native Stone and Stucco. An Attractive Feature of It is the Long, Glazed-In Dancing Pavilion Pictured at the Left. The Twelfth Hole, 203 Yards, is Proclaimed the Hardest of the 18. Tall Grass Bordering a Narrow Fairway, a Hollow with a Meandering Ditch and Rocky Embankment, Conspire against the Golfer



Above and Below are Given Two Picturesque Glimpses of the Peoria, Illinois, Country Club's Splendid Seat. Situated on the Crest of a High Bluff Overlooking the Illinois River, and Surrounded by Magnificent Grounds and Beautiful Trees, the Building Has an Exceptional Setting. More Famed Are the Quarters and Scenery than is the Nine-Hole Golf Course, Which Has No Particularly Distinguishing Feature



Before His Untimely Demise, George Fitch Frequently Played on the Nine-Hole Course of the Kickapoo Golf Club at Peoria, Illinois. It is in Honor of Him That This Broad, Deep Ravine, before the Sixth Hole, has been Named Fitch Hollow. The Distance from Tee to Green is 120 Yards





## AND SOME OF ITS BEST-KNOWN GOLF COURSES



In Addition to Its Elegant Quarters, the Edgewater Golf Club at Chicago Boasts Interesting, Sporty Links. From the Clubhouse's Broad Verandas the Entire Course is Visible. Probably the Most Difficult Hole is the Seventh, 370 Yards. At 280 Yards from the Tee the Fairway is Crossed by a Formidable Bunker Which Slopes into a Small Lake from Which the Picture at the Right was Taken. Trees Guard the Green on Both Sides. While Pits Catch Overdriven Balls



A Large and Very Imposing Colonial Home Situated on a Knoll Overlooking the Whole Course, Harbors the Members of the Exmoor Country Club at Chicago. One of the Aggravating Holes is the Thirteenth, Which is Guarded Solely by Water, as Pictured Below. The Lake is an Artificial One, 40 by 100 Yards in Dimensions. The Distance of the Hole is 150 Yards. Par for it is Three, but it has been Played in Two



Few Clubs are Better Known than the South Shore Country Club at Chicago. Its Pretentious, Richly Outfitted, Five-Story Clubhouse beside Lake Michigan is One of the Finest in America. In Playing the Seventh Hole on the Nine-Hole Course the Artificial Lake Shown Above Offers a Menial Hazard. The Distance of the Hole is 167 Yards, with Three as Par. It has been Made in Two Strokes a Number of Times. Additional Difficulties are Presented by Trees Which are Encountered by Hooked or Overdriven Balls





## TOYS ARE USED IN COURT TO DESCRIBE ACCIDENT

During the trial of a damage suit against a railroad company and a jit-



In Testifying to the Court. Each Witness Illustrated His Statements with the Aid of the Street Map, Toy Train, and Car

ney-bus owner at Long Beach, Calif., a toy train and motor car were used on a map, showing the intersection of Tenth

and California streets, to assist witnesses and the attorneys in making their statements clear to the court. A jitney had collided with a passenger train at the crossing, resulting in the

death of four persons. The model was placed on a table before the jury box, and the miniature train and car moved by different witnesses to show graphically the relative positions of the originals when they first saw them, as well as immediately preceding, and at the time of, the tragedy.

The map was drawn to scale and the buildings

lining the streets cut from blocks of wood and colored with chalk. The model proved to be very helpful.

3078

## SPEEDY WATER SLED RIDES ON FLOATS

What has been designated as a hydro-glider is a new water craft, driven by an air propeller, which has been built by two young men in Bellevue, Ky., and tried out by them on the Ohio River. The strange-looking vehicle has a body 24 in. wide resembling an automobile body, and is supported by two

floats. One of these is at the rear and is 6 ft. square, and the other is at the front and is 4 ft. 9 in. long by 4 ft. 4 in. wide. These floats are made of cedar and oak and have a sharp forward edge which is tilted slightly above the water. The craft is equipped with a shallow-draft rudder and an automobile steering wheel. All the control centers in the second of two cockpits. Power is derived from a 30-hp. automobile engine which drives a 6½-ft. air propeller mounted at the rear. The glider weighs 750 lb., is 15½ ft. long, and at rest with a load draws 5 in. of



A Water Craft Which Rides on Floats: It is Driven by a 30-Horsepower Automobile Engine and When Traveling Draws About Two Inches of Water

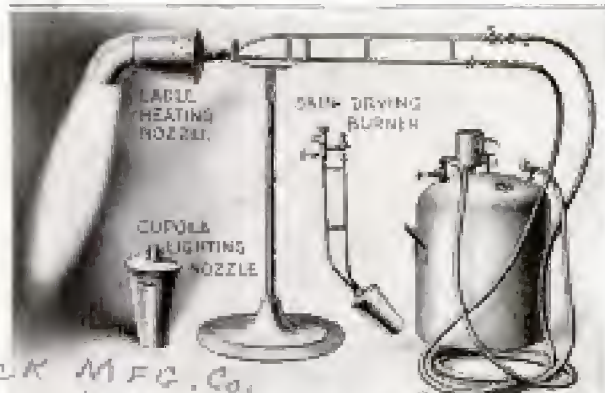


water, while its draft when under way is but 2 in. The builders propose to substitute a more powerful but lighter motor of the rotary type which their tests lead them to believe will drive the glider at more than 30 miles an hour. The craft is so constructed that ice runners can be substituted for the floats.

2832 —

### FOUNDRY BURNER HAS SPECIAL FEATURES

A portable burner for lighting cupolas in foundries, heating ladles, etc., is now being manufactured, in which are combined a number of desirable features. The burner consumes crude oil, kerosene, or distillate which is discharged in a fine spray produced by compressed air that is pumped into the tank. Three nozzles are included with the outfit, one for skin-drying molds, one for heating ladles, and the third for lighting cupolas. A stand



HAUCK MFG. CO.

140 LIVINGSTON ST.

A Burner for Foundries Which Consumes Crude Oil or Kerosene and is Equipped with Three Interchangeable Nozzles

BROOKLYN, N.Y.

is provided to support the burner when heating a ladle. The tank is equipped with a safety valve, which automatically shuts off the oil supply in case the hose is accidentally cut. The outfit is comparatively light and can be moved about easily.

3209 —

### CAMERA FOR AEROPLANES OF MILITARY TYPE

A camera recently introduced to the attention of military airmen takes a 4 by 6-in. photograph every four yards during the flight of an aeroplane, and

can keep up that rate for a considerable length of time, according to the inventor. It is designed for use with army machines. An airman flying over the



COPYRIGHT, AM. PHOTOGRAPH.

Camera Designed for Use with Aeroplanes, Taking Photographs Every Few Yards during Flight

enemy's lines could thus obtain photographs showing details of the scenes below that would not be visible to the eye of the keenest observer.

— 3250

### SIMPLE TIRE CARRIER FOR MOTOR CARS

Spare tires carried on the side of a motor car are generally regarded as unsightly and *Hoover Spring Co., Inc.*

they are often in the way. Hence the growing tendency in favor of rear-end tire carriers. A new carrier of this type, which has lately made its appearance in the West, holds one or two tires in such a manner that there is nothing



TIRE CARRIER

SAFETY FIRE PROOF

in contact with them to chafe the casing, no straps, chains, or pans being used. A simple system of toggles or arms is used to hold the tires firmly in place, and a padlock protects tires and rims from theft. To remove a tire it is necessary only to unlock the padlock and push in the toggles, no tools being required.

INV: A. J. MOTT LAU



# Geo. A. Walton, 90 The Post,  
259 Wash'n St., Boston.

242

3055

## POPULAR MECHANICS



Collection of Guns and Rifles Confiscated by Massachusetts Game Wardens under New Law Prohibiting Aliens from Having Firearms in Their Possession. They were Recently Taken Out into the Harbor at Boston and Dumped

### MANY WEAPONS CONFISCATED IN MASSACHUSETTS

About a year ago the state of Massachusetts enacted a law prohibiting aliens from using or having in their possession firearms of any character while within the confines of the commonwealth. The purpose of this legislation is to restrict hunting by unnaturalized foreigners and prevent the undue destruction of game and other birds, which are frequently killed in large numbers by such persons. As a result of the ruling a considerable number of rifles and shotguns of different kinds have been confiscated by the authorities. The law carries with it a fine and prison sentence for those found guilty of violating it. For this reason many aliens who have hunted in spite of the ruling have thrown away their guns and taken to their heels upon the approach of game wardens. These weapons, some of them cheap, but a

few excellent pieces, have fallen into the hands of the authorities. Not long ago a collection of some 50 guns and rifles which had been gathered in a very short period, were thrown into the harbor at Boston. Among them was a 20-gauge shotgun fashioned to resemble a walking stick.

### POWERFUL NEW LIGHT ON ALASKA COAST

*Comm. Report 9-22-1916*

The Cape St. Elias light station, which was recently placed in commission, is an important aid to shipping on the coast of Alaska. For vessels bound for Cook Inlet or Prince William Sound from the Pacific coast of the United States or from southeastern Alaska, it serves as the landfall light. The lamp is of 300,000-cp. capacity, and because of its elevation can be seen more than 15 miles. The fog signal consists of a 6-in. automatic compressed-air siren, in duplicate, each



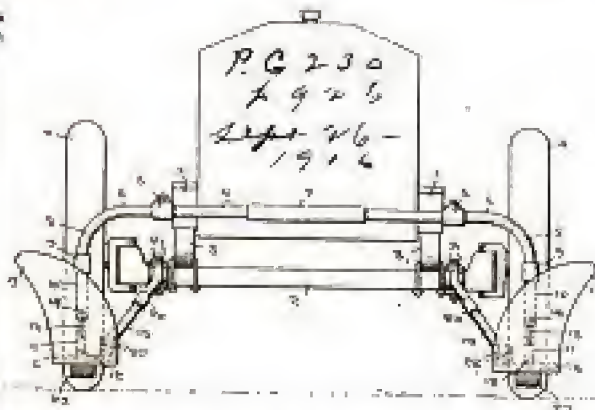
with a trumpet with a two-way mouth. The light gives a double flash every 20 seconds and the horn a double blast of four seconds each, every minute. The station is located on the south end of Kayak Island, 45 ft. above the level of the sea. Living accommodations for three keepers are provided. An automatic gas light was maintained on an off-lying rock during the construction of the lighthouse.

2861

### SNOWPLOW ATTACHES TO FRONT OF MOTOR CAR

An automobile snowplow, which is capable of rendering good service on snowbound roads, has been invented and tried out with success. Two steel shares, resembling the share of an ordinary walking plow, are attached to the front of an automobile by means of a special fender. The shares are so

100,076. SNOW-PLOW. CLAUDE C. HYDE, Otisville, N. Y. Filed May 20, 1916. Serial No. 100,744. (Cl. 165-131.)



1. The combination with a motor propelled vehicle having wheels thereon, of a pair of plow structures, comprising mold boards, frames carrying said mold boards, adjustable bumper carried by the vehicle, means to justably and yieldingly attach said frames to the ends of the bumper, and adjustable brace bars between said frames and parts of the vehicle.

2. The combination with a motor propelled vehicle having wheels, of a pair of plow structures, comprising mold boards, frames carrying said mold boards, a bumper carried by the vehicle, hollow standards attached to said bumper, shanks attached to said frames and having their ends entered in the standards, yielding means between the shanks and upper ends of the standards, means to limit the longitudinal movement of the shank, and adjustable means extending between the frames and parts of the vehicle for bracing said frame.

3. The combination with a vehicle having a bumper thereon, and means to adjust the bumper longitudinally, of a pair of plow structures carried by the ends of said bumper, and means between the plow structures and vehicle for bracing the plow structures.

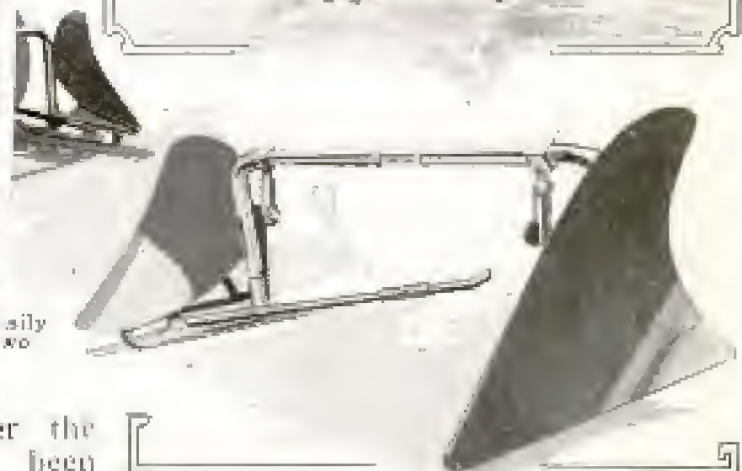
### PINS TO FASTEN COVERS ON COCKS OF ALFALFA

What is called alfalfa pins are made by a manufacturer of wire goods in the East, to use in fastening canvas covers over the tops of cocks of alfalfa left in the field to cure. These pins are made of heavy galvanized wire, are 15 in. long, and each has a 3/4-in. eye in one end, so that it can be inserted and withdrawn easily. Four are used for each cover.



Each pin is inserted into the cock for about two-thirds of its length, pointing down at an angle. Then it is brought to a horizontal position and pushed in the remaining distance. This serves to draw the cover down tight, and it is held so securely that the wind cannot remove it. Rings are provided by which each set of four pins can be kept together when not in use.

Un- helps in the to les- car The re-





### STEAM HEAT CONTROLLED BY RADIATOR COVERS

An automatic apparatus of novel character, for maintaining room temperatures at a uniform degree, has been



Under This Artistic Covering for a Radiator There Is a Regulator Which Automatically Opens and Closes "Louvres" to Maintain Uniform Temperature in the Room

*The Fulton Co.*

invented and placed on the market in Knoxville, Tenn. Outwardly this is a thoroughly insulated covering, or jacket, which fits over the steam or hot-water radiator, and is made of furniture steel, having a properly designed grill in front. Back of this are placed "louvres," or shutters, which are opened or closed automatically by the concealed regulator, as it responds instantly to the slightest change in temperature of the air circulating over and around it. The regulator is so arranged that it is exposed to the room air. When it opens or closes the louvres, the circulation of air over the radiator is thereby increased or decreased, so that the temperature of the room is held practically constant. Any temperature between 60° and 80° F. can be obtained by setting a regulator dial at the proper point. The dial is found just under the top of the jacket. The apparatus is especially fitted for the maintenance of equable

temperatures in the rooms of hotels, schools, hospitals, clubs, and other large buildings, as well as residences.

### INDIVIDUAL DRINKING CUPS FOR CITY HORSES

# 3179 *3179 - a drinking cup for horse*  
C. L. EDWARDS 68 W 97 St. N.Y.C.

An improved drinking fountain for horses has made its appearance in the large cities, where the ugly and insanitary horse trough is a thing of the past. The new fountain has individual drinking cups or bowls, in which the water comes surging up through the bottom of each bowl and keeps it overflowed all the while, so that the muzzle of the horse in drinking does not touch even the brim. There is no return of waste water through the bowl, nor is any water permitted to stand in the bowl or in the large basin of the fountain, for all waste is carried at once through openings in the bottom of the basin to the sewer. Thus the horse is reasonably protected against infection from this source.



Improved Drinking Fountains for the Horse, with Individual Drinking Cups, are Now Installed in City Streets



2971 Sculptor → Merrill Gage Topeka, Kansas



MODELING A HEROIC STATUE OF LINCOLN

WHILE the model of a heroic statue is in the making there is little in its gratesque appearance to suggest the beautiful finished product. This is well illustrated in the accompanying photograph of a Topeka, Kan., studio, where the artist is shown constructing a model of a statue of Abraham Lincoln, that is to be erected in the state house grounds. This is a phase of the work which is primarily dependent on mathematics rather than artistic skill, for the sculptor is simply reproducing on a large scale the small model shown at the left of the picture. Eventually the framework which appears so ungainly, but which has been built with a view to exact proportion, will be covered with clay and will be transformed into an enlarged reproduction of the small clay model. School children and public-spirited citizens have shared in bearing the cost of this monument.

## 2979 RUSTIC OVEN FOR USE BY BEACH PARTIES

A large stone oven, roughly finished, but symmetrical and pleasing in design, has been built on the ocean beach by the city of Santa Monica, Calif., for the use of picnickers. Its cost was not great because rocks were used which had been blasted out while a road was being constructed near by. On the top of the oven are iron gratings which can be used for broiling or roasting, or for warming coffee. The rocks, together with the bricks which form the bottom of the fire pot, are cemented together. The broad, tapering chimney was built high enough to carry off the smoke so it would not annoy persons using the oven.



Substantial Stone and Brick Oven Erected on the Beach by the City of Santa Monica, California, for the Use of Picnickers in Warming Coffee or Cooking Meats

# J. Gordon Jeffery, 622 Calif. Av., Santa Monica, Calif.



## WIDE-AWAKE OUTDOOR ADVERTISING SCHEMES

Montana Power Co.



The Exterior Illumination of Business Buildings has Become a Common Method of Advertising, but the Artistic Lighting of Them Is Somewhat Rare. At Billings, Montana, a Power Company has Obtained Splendid Effects by Arranging Incandescent Lamps in Channels, Cut Vertically and Horizontally in the White Facade of Its Structure, and Covered with Opalescent Glass



This Is Not a Six-Room Modern Cottage of Spanish-Colonial Architecture Surrounded by Landscaped Grounds, but an Outdoor "Stage Setting" Which Advertises a Certain Real-Estate Company. The House and Trees Are Signboards



Billboards are Excluded in the "City Beautiful" Plans of Most Municipalities, but Los Angeles Attests That This Ornamental One, in the Heart of an Important District, Is Preferable to the Un-pleasantly Excavation Which It Hides. Arrangements were Made for Erecting a Building on the Site, but Only a Hole was Dug



Some One Once Said: "It Pays to Advertise." This Jam would Indicate as Much. Probably Not All of the Men and Women in the Crowd Immediately Dashed into the Waco, Texas, Department Store to Make Purchases after Witnessing the Style Show Staged on the Canopy in Front of the Building, but Few, if Any, of Them Failed to Learn What the Company was Offering for Sale



## THAT HAVE PROVED STRONG DOLLAR MAGNETS



Folks Chronically in a Hurry Invariably Jump at Conclusions: That Is Why One Window-Shade Dealer Has Derived Much Publicity by Being a Bit Facetious. A Roller Curtain, at the Right, is Drawn across the Windshield of His Car When It is Left at a Curb



Every Street Crowd Is Brim Full of Curiosity: Therefore This \$25 Window Display Attracted 50,000 Persons and Sold Six Machines for a Philadelphia Motor-Car Agent. The Radiator, Tire Sections, and Lamps are Attached to the Outside of the Window, Which Appears Shattered Because So Painted. Broken Glass Litters the Sidewalk, While Red Lamps and Danger Signs Complete the Illusion



## SHOEMAKER EXPERT ENABLES AFFLICTED TO WALK

Work of truly remarkable character is being done by a shoemaker—an orthopedic expert—of New York, in the fitting of shoes to those who find difficulty in walking in ordinary footwear. For ordinary cases a series of "inner foot molds" has been prepared, in sizes to fit various feet. These resemble ordinary insoles in general appearance, but the upper surfaces are uneven, having indentations and projections that insure a contact anatomically perfect for the soles of the feet. The edges are curved slightly upward. When molds are found in which the feet rest in comfort, supporting the weight of the body in perfect balance, these molds are worn inside shoes of a suitable size. The feet then rest on a sort

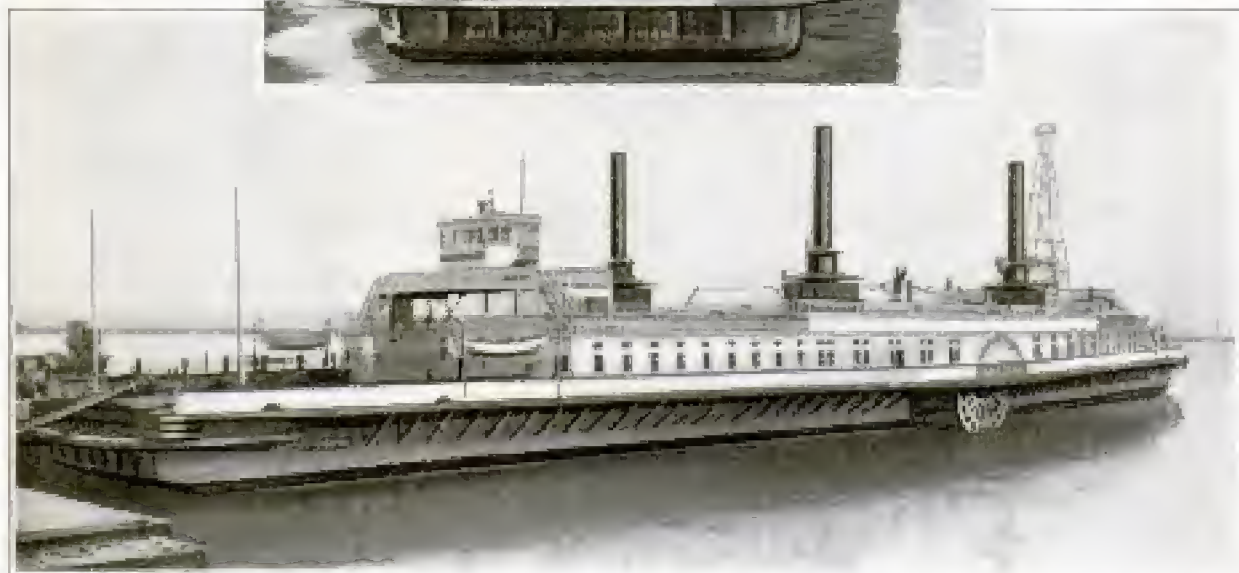
of cup-shaped cushion and are kept from pressing unevenly against hard, flat surfaces such as are found in ordinary shoes. In footwear thus fitted, the weight of the body is equal-

ly distributed to the parts of the feet best able to sustain it, all of the foot surface being used. A normal condition for the feet is thus made possible, and the bones, muscles, and ligaments are permitted to move naturally. Some extraordinary cases have also been successfully fitted with footwear after walking had become a burden or a seeming impossibility.

## 3354 ——— car GREAT RAILROAD FERRY ON PACIFIC COAST

A vessel which is claimed to be the largest ferryboat in the world carries trains across Carquinez Straits, between Port Costa and Benicia, Calif., a distance of one mile. It is the property of the Southern Pacific Railway Company and is 433 ft. in length over

all, 116 ft. beam over guards, 66 ft. molded beam, and measures 3,800 tons. The deck has four train tracks with a capacity of 36 freight cars or 24 passenger cars, and two locomotives. Two sets of oil-burning en-



Southern Pacific Ferryboat, the "Contra Costa," Which Carries Two Freight or Passenger Trains with Ease



gines, each of 2,500 hp., turn a paddle wheel on each side, by which the boat can be swung around in its own length. Hull and superstructure are of wood and contain 2,000,000 ft. of lumber. There are single timbers measuring 26 in. square and 66 ft. long, and others 18 in. square and 116 ft. long, used in the hull.

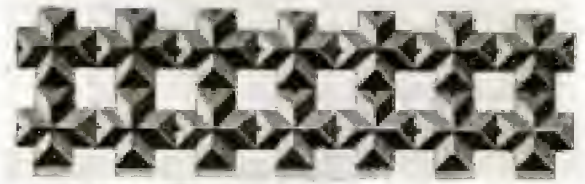
3095

### FIREPROOF LATH MADE OF WIRE CLOTH AND CLAY

*Engineering News 4-28-16*

An improved building material for fireproof construction of various kinds consists of a composite metal lath made of annealed wire cloth on which is pressed a coating of brick clay. This provides a plaster base which is strong and yet flexible. For example, the lath can be wound around a pipe or cable, that requires a fireproof coating, and covered with cement. This lath may also be used to advantage on concrete

structures which are to be covered with plaster or tile. In such cases it is placed as a lining on the forms and



COURTESY OF ENGINEERING NEWS

A Flexible Metal Lath Designed for Fireproof Construction That is Made of Wire Cloth on Which is Pressed a Coating of Brick Clay

when they are removed the concrete walls will be covered with the lath, which give them a surface well suited to bonding so that they can be covered with the proper finishing materials.

3215

### OLDEST AUTO EXCHANGED FOR LATEST MODEL

A strange-looking motor car was recently brought to light when an automobile manufacturing company in Indiana offered to exchange one of its 12-cylinder cars, 1917 model, for the oldest automobile of the same make that could be found. The eager search which followed resulted in the discovery of the vehicle shown in the accompanying illustration. It was owned by a resident of Jeffersonville, Ind., and was purchased in 1897 for \$1,250. The car, which after 20 years appears so antiquated, is equipped with a two-cylinder engine, is guided by a lever, and cranks from the side. Only a few

good condition. It can attain a speed of 18 miles an hour. The vehicle was



Automobile Made in 1897 Which was Recently Exchanged on Even Terms for a 1917 Car of the Same Make: The Old Vehicle was Secured by the Makers for Exhibition Purposes

secured to be exhibited at a good-roads celebration.

*Haynes Automobile Co.  
Jeffersonville, Ind.*



## CONVENIENT SERVER FOR CANS OF LIQUID

For serving liquids packed in cans, especially milk, a new container has



This Shows How a Can of Milk is Inserted in a New Container and Server for Canned Liquids—a Portion of the Paper Label Being First Removed as Seen in the Picture



The Act of Lifting Up the Folding Spout Cuts the Can Open, and Closing Down the Lid Locks the Spout in Place



Serving Canned Milk from the Container, Which Is Both Slightly and Sanitary and can be Used in This Manner, Just Like an Ordinary Pitcher, with the Can Inside

appeared, which supersedes the old method of opening such a package with a hammer and nail, or a can opener, making two unsightly holes in the lid, and then bringing the can to the table, where the holes promptly gum up and become dangerously insanitary. The new can server comes in the shape of a slightly and healthful creamer, made of steel, copperplated, then heavily nickel-plated. The can of liquid is placed inside this server, which is made to fit it. There is a folding spout, with a cutting edge at the bottom, which opens the can as the spout is lifted quickly to place, to be locked by the closing of the cover. Then the contents of the can may be poured as with an ordinary creamer.

## 3493 *June* SPRINKLER HEADS NEED TO BE INSPECTED

Where sprinkler systems are relied upon for fire protection it is necessary that they be inspected carefully from time to time, to see that the sprinkler heads are in working condition, ready to fuse when the temperature rises to the danger point and to let the water emerge from the pipes in case of fire. There are regular systems of inspection for this purpose and it is by no means uncommon for the inspectors to

discover sprinkler heads so badly corroded, or otherwise injured, that their efficiency is destroyed. This is particularly the case in industrial establishments where the materials used or

the methods of manufacture tend to damage the sprinkler heads. Many examples of useless and depreciated heads are sent by inspectors to the Underwriters' Laboratories in Chicago. Most of these have been damaged by industrial processes, as where they are corroded by various acids used in the arts. But in many cases the neglect of ordinary busi-

nesslike precaution is responsible for their condition; as, for instance, in a factory where sprinkler heads were found so completely gummed up by the varnish frequently sprayed beneath them in the course of the day's work that they would have totally failed to perform their duty in case of fire.

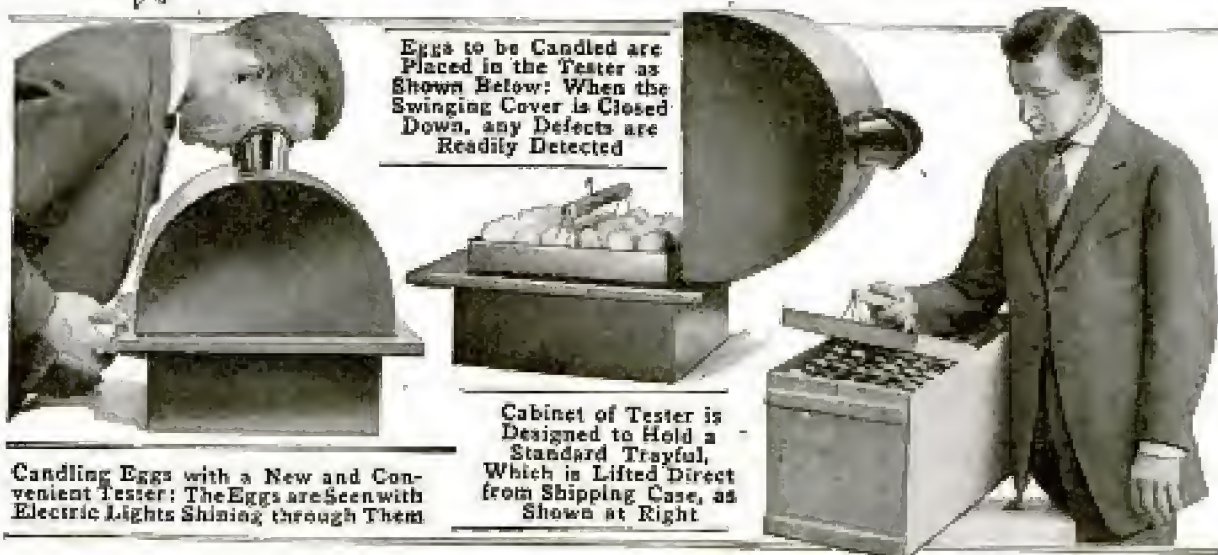
## 3054 OLD AND NEW CONTRASTED WHEN HOUSE IS HALVED

*# Walton (see p 223-242)*  
 In Cambridge, Mass., not far from Harvard University, is an old dwelling that has been cut in two lengthwise, and presents a most unusual appearance. It is an odd example of the re-



Old Frame Dwelling in Cambridge, Massachusetts, Which has been Cut in Two Lengthwise to Make Room for a Modern Brick Structure





Eggs to be Canded are Placed in the Tester as Shown Below: When the Swinging Cover is Closed Down, any Defects are Readily Detected

Candling Eggs with a New and Convenient Tester: The Eggs are Seen with Electric Lights Shining through Them

Cabinet of Tester is Designed to Hold a Standard Trayful, Which is Lifted Direct from Shipping Case, as Shown at Right

sults which sometimes follow the conflict between the promoters of modern improvements and the owners of old-fashioned structures who, because of sentiment or for other reasons, are unwilling to move or to sell their property. In this case the builders of a four-story brick building were able to acquire possession of land up to a line running lengthwise through the middle of the old frame dwelling, but for some reason they did not secure control of the rest of the property. Rather than let the land acquired lie idle the old house was cut in two and one half torn down. The wall of the new building was set so close to the wall of the remaining half that even the chimney, which was also cut in two, had to be joined to the new wall.

### RAPID CANDLING DEVICE FOR EGG DEALERS

An egg candler designed for the use of retail grocers and country merchants enables the dealer to make a rapid test of eggs in the presence of the customer or when buying from a producer. The tester is in the form of a convenient cabinet, which can be placed on the store counter. It carries its own electric-light plant in the base, above which a tray of 36 eggs, lifted direct from a standard egg case, can be placed for examination. A swinging cover is then closed over the eggs and they are inspected through a suit-

able eyepiece in the top of the cover. The electric light beneath the eggs plainly reveals those that are imperfect, which can be picked out easily from the tray. Only a few seconds are required to candle the three dozen eggs handled at one time and the device can be operated by a novice.

### WHEEL WITH CUSHIONED STEEL RIM

A comparatively simple substitute for a wheel having a rubber tire has been designed for use on trucks and automobiles. It consists essentially of a strongly built hub and spokes which support a felly, about which is a steel



A Substitute for a Rubber-Tired Wheel Having a Rim of Steel Which Rests on Cushions Placed at the Ends of the Spokes



rim somewhat larger in diameter than the felly. Inserted between this rim and felly, and opposite each spoke, is a cushion of rubber, or other material, which gives the wheel resiliency. Flanges help to hold the cushions in place. The felly and rim are held together by bolts located between the cushions. Each bolt is rigidly fastened to the rim, but is rather loosely inserted in a slot in the felly so that there is play between the rim and felly and yet the former cannot become displaced.

### 3363 INDIVIDUAL WATERING CUPS FOR CATTLE STALLS

Experience of dairy farmers has fairly proved that the maximum yield of milk cannot be secured from a cow unless she has all the water she wants to drink, just when she wants it; that is, after each feeding at least. In cold weather it is poor policy to let cows run out to an icebound common drinking trough, to get chilled; and in all weathers the common trough, with its danger of spreading contagious diseases, is regarded by the knowing farmer as undesirable. Hence a system of using individual watering cups or buckets for cattle stalls is on the in-

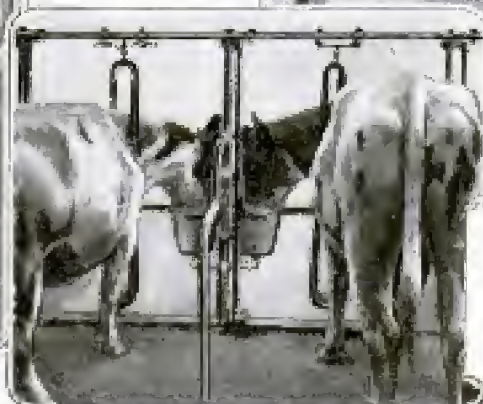
crease. By this plan each cow has her own covered cup, the lid being automatically kept closed, except while she is drinking. It is easily opened by the animal in whose stall it is located, but not by a neighbor. The level of the water in the cups is regulated by the quantity of water in a regulating, or control, tank, the level of tank and cups being the same. A regulating valve maintains a uniform level of water in the tank, the water being taken from any suitable spring, a stream, or a well. Each watering cup has a control tank with a flange inside the stall which prevents the water from being tipped out. Each cow gets the protected water from the cup into the cup.

Much interest has been gathered in the new booklet recently issued by a large eastern railway, which takes up, according to routes, most of the towns and cities on its lines. Facts about the commerce and resources of the regions traversed are also included.

*James H. Co., Mt. Atkinson, Wis.*



At the Right, an Individual Watering Cup with Its Feed Piping: The Level of the Water in the Cups is Kept Constant by a Regulating Tank and Valve. The Cow can Easily Open the Cup to Drink, but cannot Slop Out the Water



Individual Watering Cups can be Installed in the Open Air for Summer Use, as Well as in a Barn



## STANDARD NAMES ADOPTED FOR AUTO PARTS

In a timely attempt to standardize the names of automobile parts, a list of about 600 words and phrases has been adopted by the Society of Automobile Engineers and is recommended for general use. The nomenclature included in the list was developed at a series of meetings of engineering and service representatives of leading automobile manufacturers. It comprises the more important parts throughout the whole of a car, minor parts such as bolts and studs being indicated in general terms. Body parts have not been included generally, nor parts of some units, such as the carburetor, which vary so much in construction as to make anything like uniform nomenclature very difficult. The list as published is classified mainly according to functions. It should aid materially in securing uniformity in usage that will prevent many of the delays common in replacing parts, and also tend to greater clearness and brevity in the vocabulary of the automobile. For instance, the use of the name "engine" is recommended rather than "motor," to avoid confusion with electric motors; while the terms "foot brake" and "hand brake" are recommended instead of "service brake" and "emergency brake."

CA congressman-elect recently traveled from Philadelphia to Washington in his own biplane, piloted by an army officer. He says he is the first man to fly to congress.

## NEW NAVAL ANTIAIRCRAFT RIFLE TESTED

The present war has wrought many changes in the fighting equipment of all nations and perhaps none are more interesting than those which have been



View of the New Three-Inch Antiaircraft Gun Mounted on a Special Platform 40 Feet above the Deck of the "Texas." It Fires 30 Shots a Minute and is Manned by a Crew of Seven Men

brought about because of the conspicuous part played by air craft. One of the weapons which fighting ships now require is the antiaircraft rifle. The 3-in. gun shown in this illustration, mounted on a special platform, 40 ft. above the deck of the battleship "Texas," is of this type. It is so equipped that it can be pointed upward at a steep angle. The weapon fires 30 shots a minute and requires a crew of seven men to operate it. If tests of this rifle prove satisfactory, other vessels in our navy will be similarly armed, for special means of defense against hostile air craft is now recognized as a necessity.



## WALLS PROTECT TREES FROM MEDIEVAL METHOD STILL

# *Maple, 322 Boynton St.*  
**DIRT FILLING** *T. L. Briggs, Adv. Mgr.*

When filling a piece of property in Highland Park, Calif., with several feet of dirt the owner found that a number of fine trees were likely to be injured



Means Used in Highland Park, California, to Protect Trees on a Piece of Land Which was Filled In with Several Feet of Dirt

by the piling of so much earth about their trunks. Rather than lose them, he built an 8-in. concrete wall around each one, about 4 ft. from the trunk and 6 ft. high. This gave the trees plenty of "breathing space," and when they were irrigated the sunken areas served as convenient reservoirs for the water. Horses were allowed to run on this piece of land and so the unusual guard about each tree served to protect the roots from the pawing and stamping of the animals.

## USED TO CAST BRONZES

The method of casting bronze statues which Cellini and other Italians brought to such perfection nearly four centuries ago is still rather closely followed by at least one well-known foundry in this country in its production of artistic bronze figures. The first step is to take the original clay statue made by the artist and cut it into pieces from which half-and-half molds can be made. Positive wax casts are then made from these, first by brushing melted wax on the inner surface of the negatives and then by pressing in sheets of wax by hand, forming a coating from  $\frac{1}{4}$  to  $\frac{3}{4}$  in. thick, according to the size of the statue. The various wax parts so made are assembled and form a wax duplicate of the bronze figure to be cast. Unless it is a very small statue the center is filled with a core to save material. Workmen now provide the wax figure with gates and vents in the shape of wax rods. Bronze rods are inserted to serve as chaplets, or braces, to keep the core in place. The next step is to cover the figure with a thick coating of a claylike compound that hardens rapidly. This rounded mass, which bears no resemblance to the statue, is baked over a slow fire, thus melting out the wax and leaving a negative shell and the core



Applying Wax to Inside of Plaster Negative: After Thin Coating has been Brushed On, Thin Wax Sheets are Pressed In by Hand



The Various Wax Parts Assembled, Forming a Duplicate of the Bronze Figure to be Cast



Wax Statue After Wax Rods have been Attached to It to Form Vents. Other Rods of Bronze Serve as Chaplets





Molds Which have been Baked and from Which the Wax has been Melted. After the Bronze has been Poured in and Cools This Outer Coating is Chipped Off



The Final Step: Hand-Finishing the Bronze Figure with a Stiff Brush. The Surface is Usually Chemically Treated Also, to Produce the Color Admired by Artists



Carefully Removing Small Particles of the Molding Compound Clinging to the Surface of the Bronze. All the Work in Making Each Statue is Done by Hand—a Fact Which Adds Considerably to the Expense



Wax Replica Covered with Molding Compound, More of Which is to be Added. After the Outer Coating has been Completed the Object is Baked and the Wax Melted Out and Replaced by Bronze



Bronze Statue as It Comes from the Mold. Which has been Carefully Broken Away Piece by Piece. The Rods and Gates will be Removed by Hand



with a narrow space between. The bronze is poured into this mold and so the statue is formed. When it has cooled, the covering is carefully broken away and the core removed. The task which remains is to remove the various gates, or bronze projections, which formed in the vents and to finish off any slight unevennesses in the surface.

3275

### FIRST HAWAIIAN AIRMAN GETS PILOT LICENSE

The first Hawaiian airman to receive an official pilot's license from the Aero Club of America traveled 6,000 miles



COPYRIGHT BY AERO NEWS SERVICE  
Sen Yet Young, the Only Hawaiian Airman. Recently Made a Successful Solo Flight for His Official Pilot's License

from Honolulu to make the necessary solo flight at the Curtiss training field, Buffalo, N. Y., recently. His name is Sen Yet Young, his father being a wealthy Chinese resident of Honolulu, where the airman was born. As he is the only Hawaiian who has mastered the art of flight, he remained to study the mechanics of the aeroplane at the Curtiss factory, before returning to Honolulu, where he will have to act as

Fifty replicas of the statue shown in the accompanying illustrations are to be presented as perpetual trophies to the national guards of the various states. The figure is that of Eliphalet Remington, who completed his first rifle in 1816. A large copy of the statue is to be erected in Ilion, N. Y., the home of Remington.

his own mechanician. He will take back an aeroplane to Hawaii and expects to astonish the natives with some spectacular flights.

3349

### PANORAMIC CAMERA FOR MOTION PICTURES

With the ordinary moving-picture camera the field of sight is limited to an angle of  $30^\circ$ , but a panoramic camera recently perfected by a Nashville, Tenn., man is capable of taking moving pictures covering a field just five times as wide, or an angle of  $150^\circ$ . Five lenses are used, each set at a different angle, so as to secure the greatest possible range. The film used is  $3\frac{3}{4}$  in. wide, or about three times the standard width, and the two sets of sprocket holes are of the ordinary kind. Operation of the five shutters is centralized and controlled by a single crank, which works similarly to that of the standard camera. The panoramic view is recorded in five sections which appear side by side on the wide film and harmonize perfectly when projected upon a screen of special width. At a private exhibition by the inventor in Nashville recently, the screen used was 75 ft. wide and a remarkable reproduction of a baseball game was shown. The camera had covered the entire field. All the players, the outfield, and even the flight of the ball through the air, could be seen and judged as though the spectators were seated only a few paces behind the home plate. Interior views, for photoplays, may be filmed with the same facility and completeness as outdoor scenes, the new camera being readily adaptable to studio use.



# Salvaging Human Wrecks from War's Scrap Heap

IN THREE PARTS

By SEARLE HENDEE

## PART III—Reeducating the Maimed

THREE months after the outbreak of hostilities, France began preparations for the reeducation of its "glorious cripples," the army of rebuilt men pouring from the military hospitals into the streets, there to feel the cruellest sting of war. One by one the other belligerent nations took similar steps; some a bit late, but all in due course. Today nearly the whole world is struggling to meet the most appalling human problem that civilization has ever faced, that of converting millions of disabled, broken-spirited soldiers

into useful, self-reliant, and self-supporting civilians.

Several months ago the Danish War Study Society estimated, after careful investigation, that 11,245,300 combatants had been wounded, and of that number, 3,313,700 "hopelessly," during the present conflict. Europe's battles are being waged by men and boys of all walks of life. Leaving the hospitals are throngs of limbless, paralyzed, blind, deaf, and worn-out men. Among them are musicians whose hands are missing, railroad men whose feet are

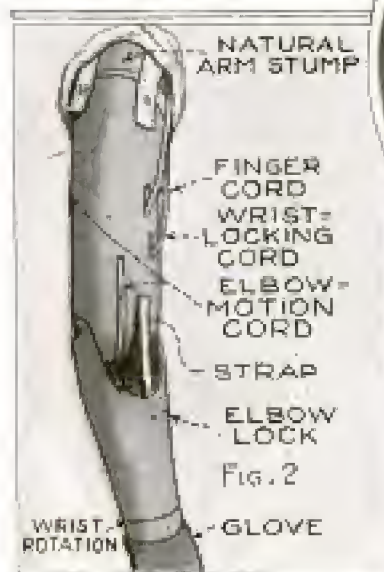


FIG. 2



FIG. 6

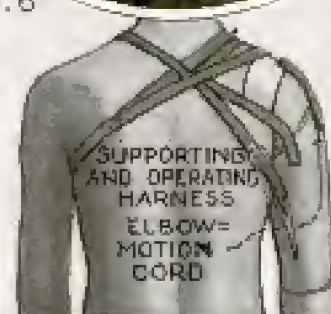


FIG. 1



FIG. 7

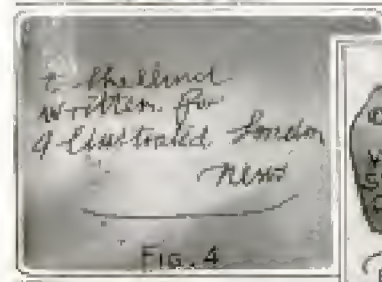


FIG. 4

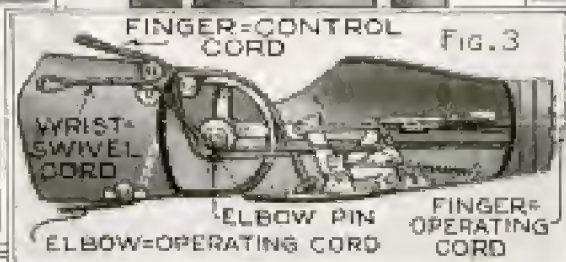


FIG. 3



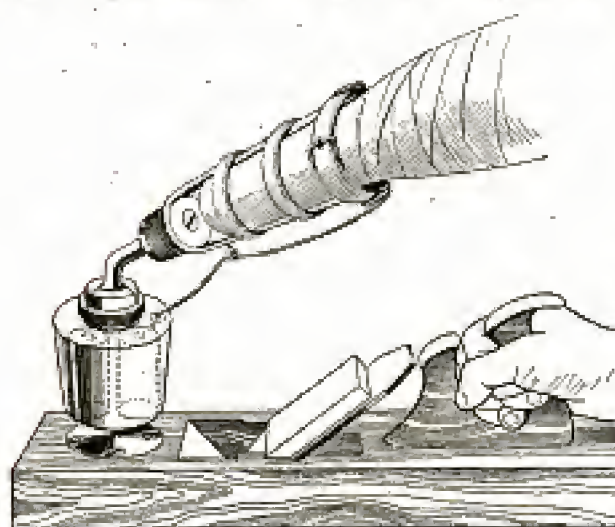
FIG. 5

BY COURTESY OF THE ILLUSTRATED LONDON NEWS

Figure 1 Illustrates the Supporting and Operating Harness Used with an Artificial Arm of American Invention, Shown in 2; the Elbow, Wrist, and Finger Mechanism is Indicated in 3, While Figure 4 is a Specimen of the Penmanship of a Man Fitted with This Ingenious Member. Coins can be Picked Up, a Hat Tipped, or Papers Handled with Ease, as 5, 6, and 7 Picture



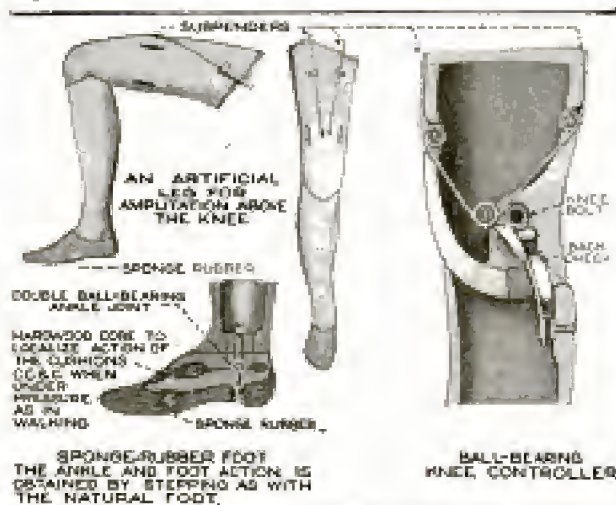
gone, telegraphers who cannot hear, and machinists who are sightless.



For Certain Kinds of Manual Work, the Magnetic Hand, a German Invention, Seems to be Practical. It is Shown Here in Use by a Carpenter.

Then, too, there are those pitiful wrecks with children's minds.

Fortunately for all concerned, artificial limbs are being perfected which perform to a remarkable degree the functions of the members they replace. They are no longer designed chiefly to lessen the conspicuousness of men's deformities. This is the salvation of Europe and its shattered soldiers. The empty sleeve and the peg leg have



FROM THE ILLUS. LONDON NEWS  
These American and European Artificial Limbs Are Among the Best so Far Devised: The Foot of the Leg Has a Sponge-Rubber Sole, a Remarkably Flexible Substitute

passed. In their place are a highly ingenious mechanical arm fitted with a hand almost human in its movements, and a leg, with flexible joints, that ena-

bles its wearer to walk without limping noticeably.

It is gratifying to know that what the French and English consider the most admirable artificial arm yet developed is a product of a Kansas City concern. With this device a large percentage of the ordinary needs are met. Straps that fasten about the shoulders manipulate the arm, causing it to rise, stretch out, bend inward, or drop life-like in the position of rest. The motions are imparted by the shoulder-pull thongs which in turn actuate the mechanism. In the same manner, the hand is opened or closed at will, turned at the wrist, and moved back and forth. By extending the arm the fingers are opened. By then bending or lowering it, they are closed so as to grasp firmly an article of almost any "reasonable" shape. Thus most of the daily needs can be performed quite satisfactorily, while a man who has lost only one arm is enabled to do almost whatever he wishes.

Another wonderful hand is one invented by a Berlin surgeon, Max Cohn, who lost his left forearm through an infection contracted while operating on a wounded soldier. This device is so ingenious that it has allowed its inventor to continue his professional work without serious difficulty. The fingers can be stretched out, separated, brought together, and curled in quite a natural manner, while the hand, in addition to opening and closing readily, can be turned with a wristlike motion from one side to the other. Motive power is supplied from the shoulder by means of a harness. One engineer, who lost both hands and was supplied with artificial ones of this type, found it possible to do his work almost as well as originally.

For tradesmen, farmers, and laborers, devices that bear little or no similarity to the human hand so far as looks are concerned, but which have the necessary strength for heavy work, and in some cases also the agility of motion needed for writing, are made. One of these is essentially a holder for various tools specially designed to be





Although Bearing No Similarity to the Human Arm, These Mechanical Substitutes Enable Their Wearers to Do Work of Various Kinds. Copied from an Actual Photograph, the Sketch Shows a Man Writing Legibly with an Arm Amputated Far above the Elbow, and a Girl, Whose Forearm is Missing, Crocheting. These and Other Equally Delicate Operations can be Performed Readily



The Man Pictured in the Upper Left-Hand Corner of This Page is Using the Type of Arm for Which the Implements Illustrated Above are Intended. The Gloved Hands are Designed Only for "Dress Parade," for Their Fingers Are Actionless and They Merely Tend to Conceal Deformity



PHOTO COPYRIGHT MILDEN PHOTO SERVICE

Here Is a Well-Known French Motor-Car Driver Who Lost Part of His Right Arm in Battle. The Mechanical Substitute Which He Wears Enables Him to Control a Machine Easily



Mechanics and Others Whose Work Depends Largely upon Their Arms and Legs have been Crippled. But Many of Them are Learning to Pursue Their Occupations with the Aid of Artificial Members



Bicycle Riding is Not Barred to Armless Men: Even Soldiers Who have Lost Both Hands and a Foot can, with the Aid of Artificial Limbs, Use a Cycle. To Many the Vehicle is a Great Benefit



fitted to it. Different forms of grips also permit the use of shovels, carpentering tools, and other implements. Another consists of a jointed steel bar that can be adjusted to different positions. It has a ball-and-socket joint in the stump to which it is fixed, and at the opposite end a crab-claw grip. To most of these a gloved hand can be attached for street wear.

Quite interesting is a magnetic hand, introduced in Germany, that has proved helpful to certain classes of workmen. It is provided with a strong magnet mounted on a ball-and-socket joint so that the poles can be brought into any necessary position. With it, metallic articles, or those of other materials fitted with metal plates, can be raised, moved about, or held firmly. Current is supplied through a flexible cord and is switched on or off at will. For many operations, such as handling sheet metal for stamping machines, and doing planing, filing, and similar work, the appliance operates very satisfactorily. Magnetic tweezers, pinchers, and fingers are also used. A portable battery provides current when a lighting circuit is not available.

As for artificial legs, one of the most ingenious can be used almost without exciting notice. A cushioned knee hinge joins the thigh and lower portions, while, a lever, pivoted in the former and connected with a spring inside the calf, allows it to be bent naturally. A central ankle pivot, which makes possible an easy stepping movement, is provided in the foot. Rubber cushions beneath the heel and instep absorb the shocks. The foot piece of another leg of this sort has

a double ball-bearing ankle joint which provides for sidewise motion. Similar to this is one with a rubber-ball joint that has almost the pliability of the human ankle.

Not long ago a New York business man who had just returned from central Europe remarked, during a conversation, that he had seen comparatively few maimed soldiers in Germany and Austria. Had this man gone a short distance from Berlin or Vienna, however, he might have discovered whole villages of them. Right at this time war cripples are not being placed on exhibition for American travelers. "Cripple Town" is to be



BY COURTESY OF OFFICE APPLIANCES  
Here Is One of the Special Typewriters That have been Devised for Crippled Men: It can be Successfully Operated with One Hand and a Leg

found almost anywhere except in the capitals and big cities of the Continent. In some instances these camps of limbless men are situated on large estates in the countryside. England, France, Germany, and Austria each has 50 or more of them, some accommodating several thousand soldiers and sailors. Belgium has a few, Russia may have many, and Italy is establishing them. They are the places where the reclaimed soldiers are taught to use their mechanical limbs and make themselves self-supporting civilians.

The reëducation of Europe's millions of maimed thus includes both their mental and physical training, or retraining, as the case may be. In the main there are three general classes of cripples: those who have been accustomed to mental work, those who have done physical work but are capable of the former, and those who have done and must continue to do physical labor. Of the three, the last group offers the greatest difficulty. In all cases, how-





ever, the first step is to endeavor to devise some means of enabling an individual to resume his former occupation. When this effort fails, the next move is to find work, as nearly analogous as possible to that formerly pursued, that can be undertaken successfully. Often this tests the ingenuity of the instructors and the patience and courage of the apprentice to the extreme.

One of the most interesting things in connection with this great undertaking is that the blind are teaching the blind and the crippled instructing the crippled.

The Pictures on This Page Illustrate What is Being Done at St. Dunstan's Lodge in Regent's Park, London. Above Is to be Seen the Anatomy Class in Session. The Men, All of Them Blind, are being Given Professional Instruction in the Art of Massage



Gardening, Poultry Raising, and Other Outdoor Occupations are Open to Blind Soldiers. With the Aid of a Guide Line or Board the Sightless Men Quickly Learn to Spade Ground and Plant Vegetables



Push Ball Is a Popular Form of Recreation for the Inmates of St. Dunstan's Lodge. Their Shouts of Triumph and Cries of Laughter Are so Surprisingly Full of Joy and Abandon That One can Scarcely Believe the Players Are Blind





The Presence of Artificial Arms and Legs Instead of Real Ones No Longer Spells Uselessness to the Ex-Service Man. Maimed Soldiers at One of the Cripple Camps are Shown Here Absorbed in Schoolwork

pled. Maimed men are the most successful tutors of the downhearted "amputés" who come fresh from the hospitals, their movements awkward, their courage dying. With a sympathetic bond existing between teacher and pupil, and all of the psychological forces acting in the right direction, veritable wonders are accomplished. When a fellow with legs and arms that work with gears and levers begins to see what his companion in misery can do with similar appliances, he usually gets a grip on himself and lays to with his whole soul. And were it not for such encouragement, many of Europe's maimed could never undergo the metamorphosis that restores manhood and usefulness.

Some of the most marvelous attainments in readapting these men for the workaday world are being wrought at St. Dunstan's Lodge in Regent's Park, London, where the British are teaching

blind ex-service men to do useful, profitable work.

In some of the shops the men are engaged in basket weaving, shoe repairing, wood joining, and mat making. In another department they are taught to read and write according to the Braille system, to operate a Braille shorthand machine, and to use ordinary typewriters. Then there is a model farm on the grounds where instruction in gardening, poultry raising, and the care of stock is given. It seems incredible, but these blind men soon are able to distinguish different fowls by touch, to drive chickens from one coop to another, gather eggs, and attend to an incubator. A knotted string or a notched board is used to enable sightless gardeners to spade plots of ground properly and do the necessary planting.

In determining the kind of work best suited for certain types of cripples, motion study has accomplished much.



## SETTLING BASINS CLEAR DESERT WATER OF SILT

An interesting and important problem which appeared following the development of irrigation projects in the Imperial Valley in southern California, was how to supply drinking water to the population supported by this region which once was desert. The objection to using the water just as it came into the ditches from the Colorado River is apparent, for in its wild race through the Grand Cañon it becomes heavily laden with silt and is chocolate-colored. By the time it reaches Brawley, for example, in the northern part of the valley, it has almost the consistency of molasses. The drinking-water problem for this town of approximately 3,000 persons has been solved by running the water into settling basins about 200 feet square. The amount allowed to flow into the basins when once they are full, is equal to that drawn out, which is about 200,000 gallons per day. At the end of a basin opposite the inlet is a raft which supports a vertical pipe, the end of which is submerged in the water about 6 in. Through this the surface water, which is the clearest, is drawn into a standpipe, that supplies the city mains. About 30 inches of silt will accumulate in one of these beds in a year.

## ADDING MACHINE WITH SIMPLE KEYBOARD

An adding machine with a keyboard of unusual simplicity places the decimal point in a row of figures automati-



Adding and Calculating Machine of Simplified Construction, Having Only 10 Figure Keys to Operate, and Capable of High Speed by the Touch Method

ically. There are only 10 figure keys on the keyboard, instead of 80 or 100 as in other cases, and because of this fact it is claimed that the speedy touch method can be used in figuring, thus



One of the Settling Basins at Brawley, California, into Which Silt-Laden Water is Run before being Pumped into the City's Water Tank



View of One of the Emptied Settling Basins, Showing a Deposit of 30 Inches of Silt Which Accumulated in One Year



increasing the efficiency of this calculator for office use. To introduce a number or a series of numbers into the machine, it is necessary only to strike in their natural order the keys corresponding to the figures composing the number. No attention need be paid to decimal order, in writing dollars and cents, for instance, because by an ingenious system of control by levers and stops the mechanism takes care of this, placing the figures in their proper columns—units under units, tens under tens, and so on—without the operator giving it the least concern. The machine also performs all the usual operations of a mechanical calculator, and makes a printed record of the work done.

3149

#### FOUR HOMELESS BANKS OCCUPY ONE BUILDING

The erection of a bank building which housed four rival banks and contained a single brick vault in which their funds were kept, was one of the unusual results of the fire that swept over Paris, Tex., last spring. Included among the 1,440 structures destroyed were the homes of these four banks. Permission was granted them to erect a temporary structure and vault in the public plaza. A short time after the fire, a building, 50 by 100 ft., was begun, and it was ready for occupancy 72 hours later, the work having been

rushed by night with the aid of searchlights, as well as by day. The walls were of hollow tile. The brick vault measured 20 by 24 ft. To meet the emergency, large sums of ready money were expressed to the banks, and their reports showed that they had \$4,000,000 in cash stored in the vault at one time.

— 3228

#### SAFETY FENDER FOR AUTO BUSSES AND TRUCKS

Tests were recently made by a committee of the New York Public Service Commission of an automatic safety fender designed for use on auto busses, auto trucks, and street cars, and its adoption was recommended as a "distinct advance in existing means for safeguarding the lives and limbs of persons who are struck or come in contact with such vehicles." This new fender is operated by means of springs and a trigger trip which simultaneously drops the fender and sets the brake. It consists of a lifeguard hanging vertically in front of the bumper of the car, bus, or truck, and an apron extending horizontally at any required height above the pavement and projecting 26 in. in front of the bumper. In the official tests the apron was carried 7 in. above the pavement. Lifeguard and apron are made of woven wire, with diamond-shaped mesh. The guard is suspended from flat spring

J. W. Lysons  
108-116 W. 43rd St., N.Y.C.  
(Inv. Mfr.)



View of Temporary Building Erected after a Big Fire in Paris, Texas, to House Four Banks. The Single Brick Vault in the Structure Contained \$4,000,000 in Cash at One Time





Manual Pickup of a Prostrate Man-Size Dummy in Official Test of New Safety Fender for Motor Trucks in New York. The Fender can be Operated by the Driver, but Also Works Automatically. When Not in Use, It Folds Up, as Seen at the Left

hangers, giving a cushion effect in front of the vehicle, and the apron rests against long coil springs which also serve as a cushion when the fender strikes any person. A simple locking device prevents the fender from tripping automatically on rough paving.

### THALLIUM USED IN MAKING TUNGSTEN BULBS

An interesting example of the use which is being made of various chemical by-products that formerly were thrown away, is found in the utilization of thallium from certain zinc ores. A small amount of a thallium-chlorine compound is used in making a tungsten incandescent lamp. When it has been added in the proper proportion this substance partially volatilizes and slightly decomposes. The chlorine, on being set free, combines with the brown deposit that settles on the inside of the glass bulb, forming a combination of chlorine and tungsten. This compound circulates through the lamp and after a time comes in contact with the incandescent wire and is decomposed there, by the heat, and so the tungsten is deposited on the filament from which it was originally volatilized. In this way, through the agency of this compound, chlorine over and over again causes the tungsten to return to the wire from which it was given off.

### 3293 HANDY NEW CUTTING TOOL FOR METALS

*# Geo. J. KIRCHGASSER  
484 BRADFORD AVE. WIS.*

With a new and easily operated tool invented by a Milwaukee man, holes of various sizes can be readily cut through plates of metal, fiber, or slate. It is designed especially for making additional holes in cabinets, lockers, tanks, or cases of any kind, in which it has heretofore proved troublesome to cut holes after they were finished and set up. To use the tool a pilot hole is first drilled through the material and the stud is inserted. A flange nut is then secured on the opposite side of this stud and a few operations of a ratchet wrench cuts out a neat hole. The knives, which may be adjusted for cutting holes of different diameters, are held in a swing chuck and are fed automatically by means of the spring shown in the illustration between the swing chuck and the sham nut. It is claimed that the tool will do the work of a 6-in. drill press and that many uses will be found for it in various industrial plants.



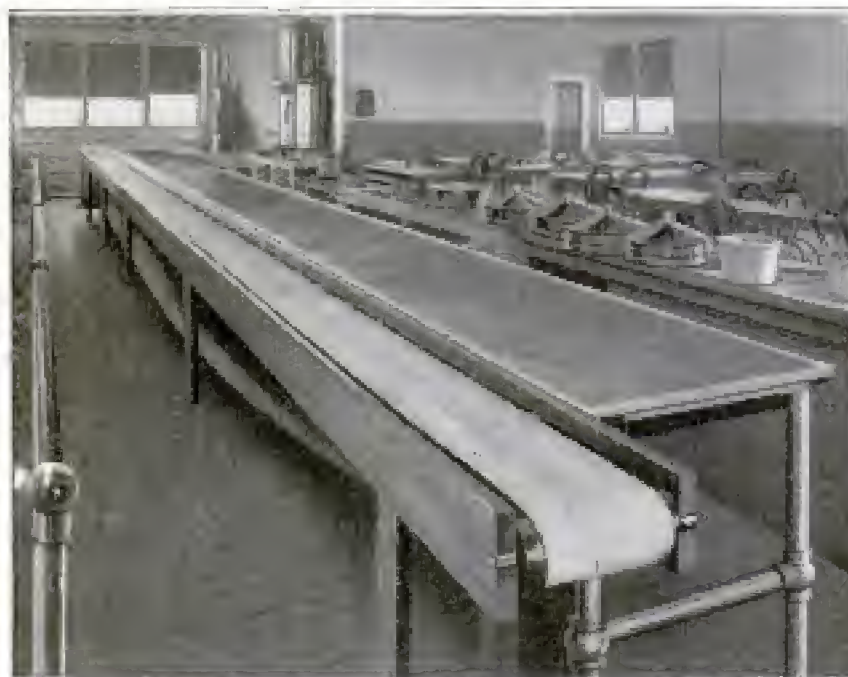
*Bach, (J.M.S.)  
Milwaukee Wis.*



### BELT CARRIES TRAYS OF CAFETERIA PATRONS

*Endicott Johnson Co.*  
A belt conveyor has been installed in a cafeteria in Johnson City, N. Y., to carry the trays of its patrons while

front of the food counter and by holding the trays level so that there is no spilling of the contents of the dishes. The cafeteria is conducted by a large shoe factory. The patrons, chiefly employees in the factory, pass in single



New Conveyor in a Johnson City, New York, Cafeteria Which Carries the Trays of Its Patrons, Thereby Preventing Congestion and the Spilling of the Contents of the Dishes

file in front of a long steam-heated counter on which is the food supply. Between the patrons and this counter is the traveling belt, which is 45 ft. long and is supported on rollers set 12 in. apart. Persons selecting food place their trays on this conveyor and walk along beside them at a moderate pace, while such dishes as they may indicate are placed on their respective trays. On reaching the end of the belt each person carries his meal to a table. Under the new system 840 employees have been served, without confusion, in 45 minutes. Formerly there was much congestion at the noon hour.

they select their food. It serves a two-fold purpose by preventing loitering in

tion, in 45 minutes. Formerly there was much congestion at the noon hour.

3334

### CAR PRESS MAKES ROOM FOR ORANGE BOXES

A frequent cause of damage to oranges in transit to markets has been the rocking of the orange boxes, through loose packing in the car, which resulted in bruising the fruit. An orange-shipper's car press, the recent invention of a Redlands, Calif., man, is therefore proving very useful to the fruit-shipping concerns of the citrus districts of that state, and to the railroad companies. Oranges are usually shipped in refrigerator cars holding 480 boxes. In loading, the boxes are placed in rows two high, and a car tie or strip is nailed across each row to hold them in place. When the rows from each end of the car approach each other in the center, the car press is shoved into

the empty space and operated by hand, after which there is room for three or four additional rows of boxes. When these are inserted, the carload is packed so compactly that the boxes cannot rock and the danger of bruising the fruit is practically eliminated. The press is a framework of heavy wood,



This Car Press Squeezes Outward with a Pressure of Two Tons and Makes Room to Pack California Oranges Tightly in a Car



but easily handled, with jackscrews that squeeze the side timbers outward with a pressure of two tons.

2980—

### PARK SEATS RESERVED FOR WOMEN AND CHILDREN

The officials in a western city have set aside certain seats in one of the city parks for the exclusive use of women and children, and their escorts. This fact is announced by a large sign placed in the middle of the walk on which the reserved benches face. This arrangement is similar to that existing in some other cities, which have recognized that women, and children as well, in a public park are not always free from annoyance by strangers. A ruling which excludes all men, except those who are acting as escorts, from certain sections or seats, serves to make a park more attractive to women

*Central Park, Los Angeles.*



Sign in Park Which Designates Certain Benches, Where Women and Children may Rest with Little Risk of being Annoyed by Strangers

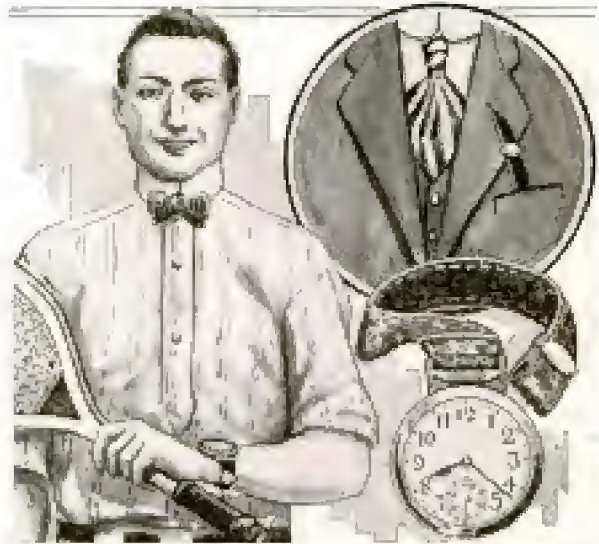
and children, and insures for them places where they can sit undisturbed.

2521—

### WRIST WATCH MADE TO BE CARRIED IN POCKET ALSO

A wrist watch has been designed by a New York watch manufacturer which can be worn either in the breast pocket of the coat, in the vest pocket, or on the wrist. The convenience of having one timepiece which can be carried when one is dressed for social functions, for business, or for outings, is apparent. Attached to the watch is a neat leather strap which serves as a wrist band or as a chain. On the end of the strap is a special hinged clasp which makes it possible to double the

guard into a loop of any desired length after passing it through a buttonhole or through the metal link on the edge of the case, opposite the stem. When



A Watch Designed so That It can be Worn on the Wrist, in the Breast Pocket, or in the Vest Pocket

one desires to carry the watch in the pocket this metal link on the case can be adjusted so that it is practically invisible. If desired, the timepiece can be fitted with a crystal described as unbreakable and made of a substance that is nonexplosive.

3056

### REMOVING FIRE HOSE FROM CASE TURNS ON WATER

A fire-hose cabinet, which has received the indorsement of several fire underwriters, is so constructed that as soon as the hose is drawn out of the cabinet water begins to flow through it. In this way no time is lost in preparing to fight the flames. In the case, at the end of the water pipe to which the hose is attached, is a valve that is connected with the flexible tubing by a short steel cable. When the tubing



*Jacques Depollier & Son,  
15 Maiden Lane,  
N. Y. C.*

*INV.  
John Egginton,  
Westfield,  
Mass.*



has been removed for practically its whole length, the valve is automatically thrown open and the water begins coursing toward the nozzle. It requires but three seconds to get 50 ft. of hose ready for action. The cabinet is equipped with rubber-covered spring supports which hold the hose in neat, compact folds without injuring it. The outfit is suited for use in a home, as well as in a store or factory.

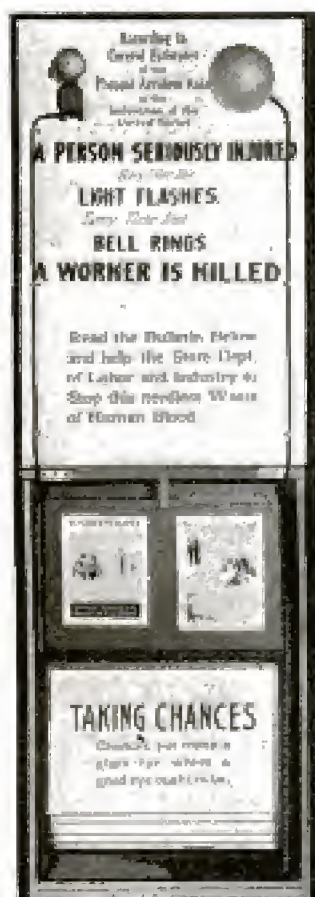
3094—

### ACCIDENT TOLL SHOWN BY AUTOMATIC DISPLAY

A mechanically operated safety-first exhibit has been devised by two em-

ployes of the labor department of the state of Kansas, which tells in a remarkably vivid manner the need of taking precautions against accidents. It consists of a vertical display case, in the upper half of which is installed an electric bell and an electric light. A printed explanation between the two declares that some one in the United States is injured every time the light flashes, which is every 15 seconds, and that a

worker is killed every time the bell rings, which occurs every seven minutes. These calculations are based on the present accident rate. In the lower half of the case a slowly revolving frame brings into view, one at a time, a series of pictures, each of which is accompanied by an appropriate safety-first legend.



### DISTINCTIVE THEATER FOR MOTION-PICTURE PLAYS

*The St. Francis Theatre, N.Y.*

A motion-picture theater has recently been opened in San Francisco in which several features common to the ordinary theater have been omitted or altered. The purpose of this has been to provide for the best possible presentation of the films and also to give the playhouse a distinctive character. There is no stage, and not even an archway such as usually sets off a screen. The pictures are thrown upon the wall nearest the street and as one passes through the curtains at the entrance he finds himself at the front row of seats instead of at the rear. Easy inclines take the place of stairs and lead to the balconies at the rear and sides. The pit for the orchestra is set low and accommodates 20 musicians. Organ pipes are concealed behind grillwork either side of the screen. All of the decorations are in pastel shades.

2940—

### INCLINE TO SHORTEN ROAD TO YOSEMITE PARK

A new mountain road and a double-track incline railway have been projected for Yosemite National Park, which when completed will shorten by 45 miles the route that westbound motorists on the Midland Trail follow when going to the park. The proposed short cut, for which it is believed the government will make the necessary appropriation of \$200,000, will lead from a point north of the valley, known as Porcupine Flat, directly down to the floor of the valley. This direct route is but six miles long. At present cars are required to follow a great loop, 51 miles long, to arrive at the same destination. About five of the six miles will be roadway and the remaining 6,000 ft. will be traversed by a tramway that will be built on a 50-per-cent grade, which means that it will make a drop of 3,000 ft. Between the Indian Cañon, which the tramway will follow, and the Yosemite Falls is a great shoulder of rock on which it is proposed to erect a hotel. The railway

*Investors:*

*B.C. Baird, Deputy Factory Inspector, } Topeka, Kan.  
A. Alden Knapp, Chf. Clk. of Dept., }*

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View in Yosemite National Park with Dotted Line Indicating Route of the Proposed Incline Railway, Which, with a Connecting Road, will Shorten One Route to the Park by 45 Miles

will be operated by a 1,500-hp. plant which will receive its power from one of the minor falls in the region. The cars of the incline will be constructed so that they can carry automobiles, and their estimated capacity will be 500 motor cars a day. The altitude of the starting point of the new road is 8,000 ft. The first two miles of the highway leading up from the head of the incline will be at an 8 and 10-per-cent grade. The remainder of the route will be practically level.

2890

#### DEVICE FOR CUTTING WIRE BARRIERS FOR TRENCHES

A device for cutting wire entanglements, such as are erected to guard the trenches in Europe, has been invented by a resident of Kansas City, Mo. The cutting parts resemble the toothed blades of a farm mower and are attached to a wooden frame that fastens to the body of the soldier or other person operating it. The frame holds the blades in a vertical position and as the teeth come in contact with an entanglement, a lever is drawn for-

ward and backward, producing a shearing motion which severs the wires.



Device for Severing Wire Entanglements Which will Cut Several Wires at a Time and will Protect the Wearer from Electrical Shocks

The frame being of wood, the wearer is protected against electrical shocks.

It is claimed that one can cut his way through barbed-wire entanglements with this device, as fast as he can walk.



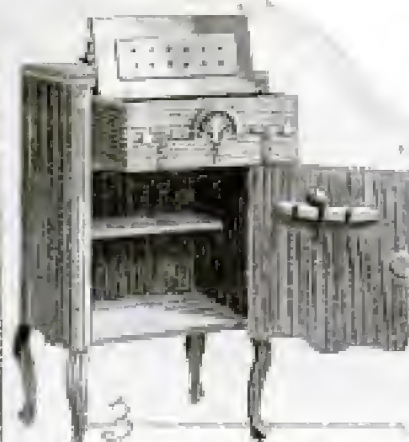
John Wanamaker  
N. Y. C.

3425  
HANDSOME AND USEFUL FURNITURE

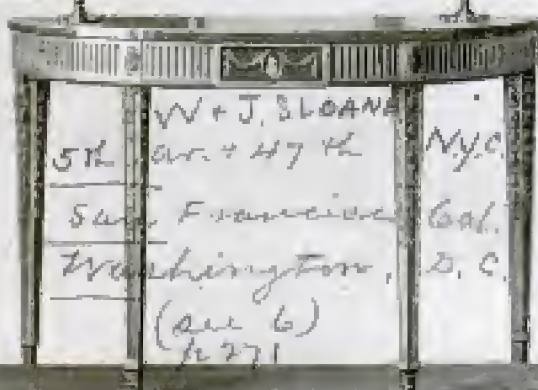
Courtesy - Davis & Co.  
Shelbyville Ind



1275  
Mahogany Sewing Table  
In Which Is Ample Room to  
Keep Work Materials. The  
Handles beneath the Leaves  
Make It a Convenient Table  
to Move



3  
Smoker's Cabinet Having a  
Spacious Humidor in the  
Upper Part. Convenient  
Shelves Below, and a Pipe  
Rack on the Inner Side of  
the Door



W + J. SLOANE  
5th Ave. + 47th St. N.Y.C.  
San Francisco Cal.  
Washington, D.C.  
(see 6)  
1271



4  
Novelty and Convenience  
Characterize This Little  
Writing Desk. When Open, as  
Shown Above, Places for Writ-  
ing Paper, Ink, and Pens are  
Revealed. When the Leaves  
are Closed, as at the Right, It  
Occupies Small Space



259  
3750  
An Odd-Shaped  
Table, 32 Inches Long and 25  
Inches Wide, with Top and  
Shelf Decorated with French  
Prints Covered with Glass.  
It Is Suitable for a Boudoir  
or Living Room

Haywood Bros + Wakefield Co.  
1415 S. Mich. Ave. Chicago

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5. The Little Shop, Around the Corner,  
531 Liberty Ave., Pittsburgh, Penna.

270  
H-10



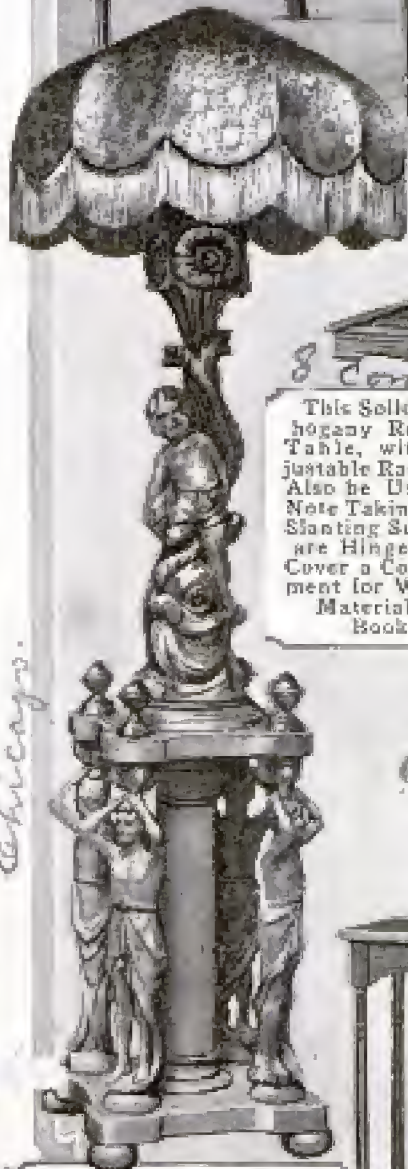
3425

FOR VARIOUS ROOMS IN THE HOME

W. & J. Sloane  
See 2 p 270  
Chicago.  
7-Overlark Furniture Co.,  
840 W. Ontario St.



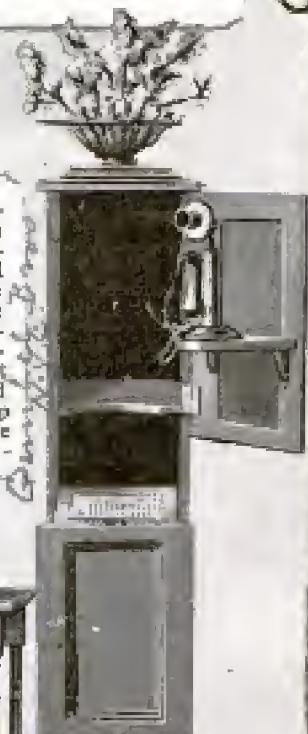
The Slender Lines of This Settee, Together with Its Cane Back, Give It a Very Pleasing Lightness and Grace. The Upholstery and Cushions are Finished in Striped Material Well Suited to the General Design



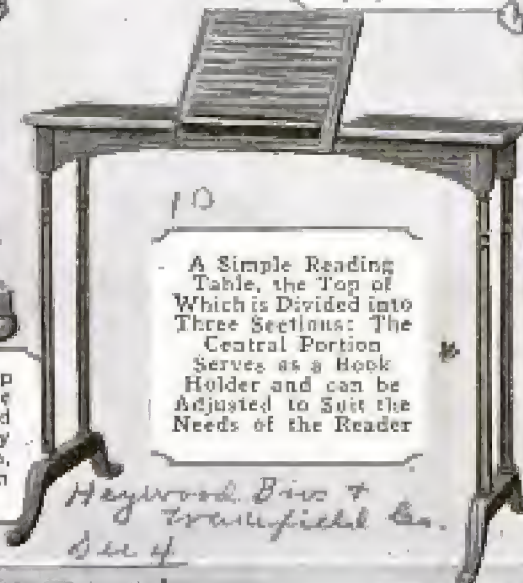
This Solid-Mahogany Reading Table, with Adjustable Rack, can Also be Used for Note Taking. The Slanting Surfaces are Hinged and Cover a Compartment for Writing Materials or Books



An Artistic Telephone Cabinet in Which the Instrument is Mounted on a Shelf on the Inner Side of the Door. A Disappearing Cane-Bottom Seat is Provided and on the Top Is a Flower Vase



Boudoir Costume, Five Feet High, of Carved Wood Decorated in Light Shades. The Base is Weighted to Give Stability



A Simple Reading Table, the Top of Which is Divided into Three Sections: The Central Portion Serves as a Book Holder and can be Adjusted to Suit the Needs of the Reader

An Electric Floor Lamp of Beautiful Design: The Elaborate Base is of Carved Wood. While the Heavily Fringed Shade Has Rich, Subdued Colors Which Shed a Soft Light

9- Gimbel Bros.,

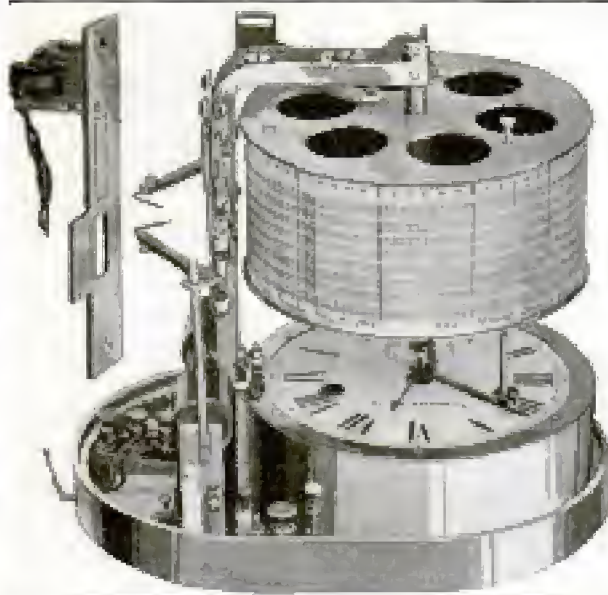
N.Y.C.



N.Y.:  
 Chas. J. Ryberg, 539 Bismarck St.  
 Chicago (President N.C. Co.)  
 272 2915 POPULAR MECHANICS  
 Chronograph Co., Inc.  
 1844-1846 Broadway, New York  
 111 W. Washington St., Chicago

## NEW DEVICE RECORDS TIME OF OPERATING DOOR LOCK

An electrical mechanism has been devised, which when attached to a door lock, makes a record each time



Mechanism Which Makes a Record Each Time a Door is Locked or Unlocked by Puncturing a Revolving Drum. A View of the Electrical Device Connected with the Keeper is Shown at the Left

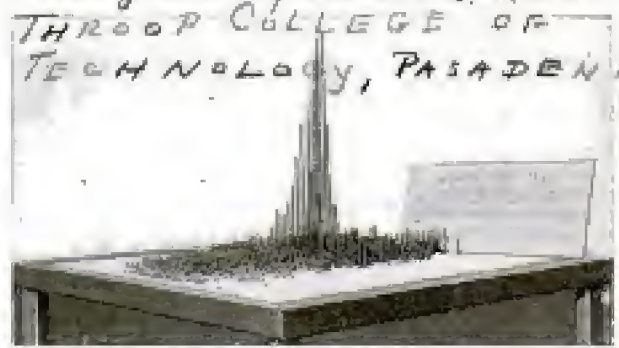
the door is locked or unlocked. The recording parts can be placed in the proprietor's or manager's office if desired. No supplementary lock is required, such as some similar devices employ. An electrically connected device is attached to the keeper in the door jamb and either the locking or unlocking of the door makes an electrical contact. This causes a needle to puncture a time sheet placed about a revolving drum, which, together with a nine-day clock, constitutes the recording parts of the protector. This mechanism is inclosed securely in a metal case so that it cannot be tampered with. The drum makes two revolutions every 24 hours. The apparatus will run nine days without attention, then the drum must be reset and a new time sheet supplied. The protector is supplemented by an electric bell which is connected by wiring with all windows and doors. If one of these is left unlocked when the person closing the establishment passes out and locks one of the protected

doors, the bell will ring instantly, thus showing that one or more of the windows or doors have not been properly secured. When a watchman is employed to enter the place at stated hours the protected lock is so equipped that the watchman's key will cause a differently shaped needle to puncture the time sheet, while the regular needle does not operate.

## TALL AND SHORT POSTS ON MAP SHOW LAND VALUES

The value of real estate in all parts of Pasadena, Calif., and its suburbs has been graphically portrayed by a novel map that forms a part of a municipal exhibit in that city. The map proper is spread out on a table, 45 in. square. On the face of it have been placed a large number of slender posts of various lengths. They are held upright by needles stuck into the table, and can be moved as occasion warrants. Each quarter of an inch in height represents a front-foot value of \$10, so that the posts show at a glance the relative values of all the land in the city from the down-town property, worth \$1,000 per front foot, to that near the mountains, worth \$5. Small tags attached to each post state the prices so that measuring is unnecessary.

Designed by Dean G. A. Darnon,  
 THROOP COLLEGE OF  
 TECHNOLOGY, PASADENA, CALI



Map of Pasadena Which Shows the Value per Front Foot of Land in All Parts of the City, by Means of Posts of Various Lengths

tain, worth \$5. Small tags attached to each post state the prices so that measuring is unnecessary.

A magnificent new passenger train, embodying the latest ideas in travel luxury, and said to have cost \$2,500,000, has been put into service between Chicago and New Orleans.



F.W. Stevens

Warren Fenner

POPULAR MECHANICS

Newton Centre, Mass.



Different Ways of Mounting the Sign so as to Apprise Motorists of Just What to Expect on the Road Ahead are Illustrated beneath the Drawings Presented Above. General Adoption of the System would Eliminate the Ununiform and Confusing Devices of Various Forms Now Used

2771

## UNIVERSAL HIGHWAY SIGNS PROPOSED FOR ADOPTION

As motor-car touring has increased, the need of simplified and standardized traffic signs along our highways has become very apparent. It is therefore interesting to study an ingenious code of signals lately devised in the East. These wordless semaphores clearly suggest the advantages that would accrue with the national adoption of some simple, uniform system. A diamond-shaped sign, with one triangle enameled red and the other white, is utilized. When in vertical position with the red half pointing downward, the sign gives warning of the proximity of a schoolhouse. A reversal of this position indicates a street crossing. Two of the diamonds mounted side by side with their red ends pointing upward announce a railway crossing. A curve to either the right or left in a road is indicated by placing the device horizontally and pointing the red end in the direction of the turn.

3255

## ARTESIAN WELL BRINGS UP FISH AFTER EARTHQUAKE

Following a recent earthquake shock which was felt up and down the Pacific coast an artesian well near Tulare, Calif., has intermittently spouted up small fish. A hundred or more of these creatures have been brought to the surface. They are about four inches long and have no eyes, in which re-

spect they resemble fish found in Mammoth Cave, Ky. Biologists in the University of Southern California state that they undoubtedly come from some underground river, the course of which was altered by the earthquake so that its waters have mingled with those of the artesian well.

2558

## POCKET TIMEPIECE WHICH WINDS ITSELF

A watch, which relieves the wearer of all responsibility as to winding it, has been invented by a jeweler in New Braunfels, Tex. "PERPETO"

The timepiece will wind itself if worn by a person for an hour or so each day. The motion of the body in walking and in shifting of posture serves to swing a little pendulum back and forth and this in turn operates a simple mechanism which slowly winds up the spring. When the winding is completed this mechanism is disconnected until the watch has partly run down and then it begins to operate again. A third hand on the face of the watch shows to what degree it is wound up. If the watch is not carried long enough to keep it from running down it can be wound by hand in the usual manner.



Jos. THIESS  
P.O. Box 456

# Jno. E. Hogg

218 S. HIDALGO AV.  
ALHAMBRA,  
CALIF.



3392

# SOME NOVEL AND LITTLE-KNOWN ACCESSORIES



Hand-Decorated Hanging Drum Aquarium, a Japanese Oddity for the Sun Room. It is Priced at \$6.75



This Aluminum Cover Enables a Milk Bottle to be Conveniently Used in Place of an Open-Top Pitcher

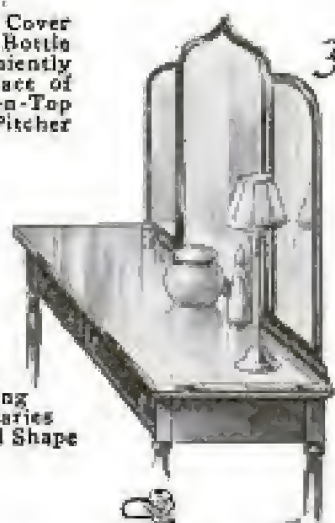
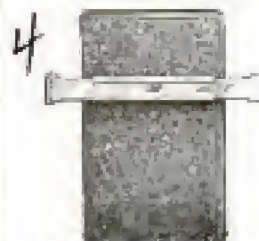


Plate-Glass Tops for Dressing Tables and Similar Furniture Protect Polished Surfaces without Lessening Their Beauty. Cost Varies According to Size and Shape



The Spring Attachment Fitted to This Bill Case Prevents It from Illicit Removal from One's Pocket. Price \$1.50 or \$2, Depending upon Case



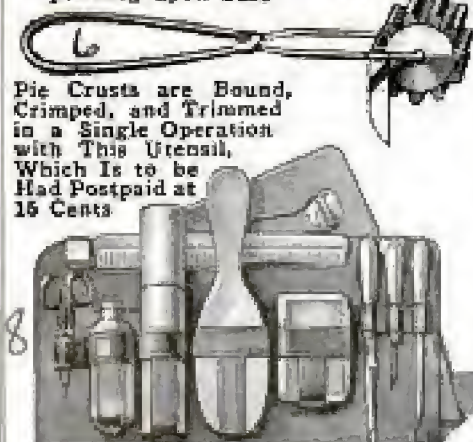
A Wire Holder Supports the Water-Shedding Paper Garbage Bag While Refuse is Scraped into It. Water Drains through Holes in the Sack. An Enameled Frame and 39 Bags Cost 60 Cents



Dainty Ribbon-Trimmed Slipper Trees with a Novel Coat Hanger, a Gift Suggestion. Available in Different Colors, Artistically Boxed, at \$5



Cross-Stitch Pattern Sheet Four by Six Inches in Size. Application of Hot Water Causes Material to Vanish After Work has been Finished. A Six-Sheet Package Is 20 Cents



Adjustable Casters Permit a Table or Other Piece of Furniture to Stand Solidly on an Uneven Floor. Set of Four, \$1

Easel Toilet Case, for the Traveling Bag, Which can be Placed in Upright Position on a Dressing Table. Including Articles Illustrated, the Price Is \$10



Sanitary Medicine Dropper That Serves Also as a Bottle Stopper. It Retalls at Five Cents



This Electric Toaster Accommodates Six Full Slices of Bread at One Time. It is Priced at \$22



This Silver-Wire Holder may be Fastened to a Plate so as to Support a Teacup When Refreshments are Served Informally. It is Offered at \$2



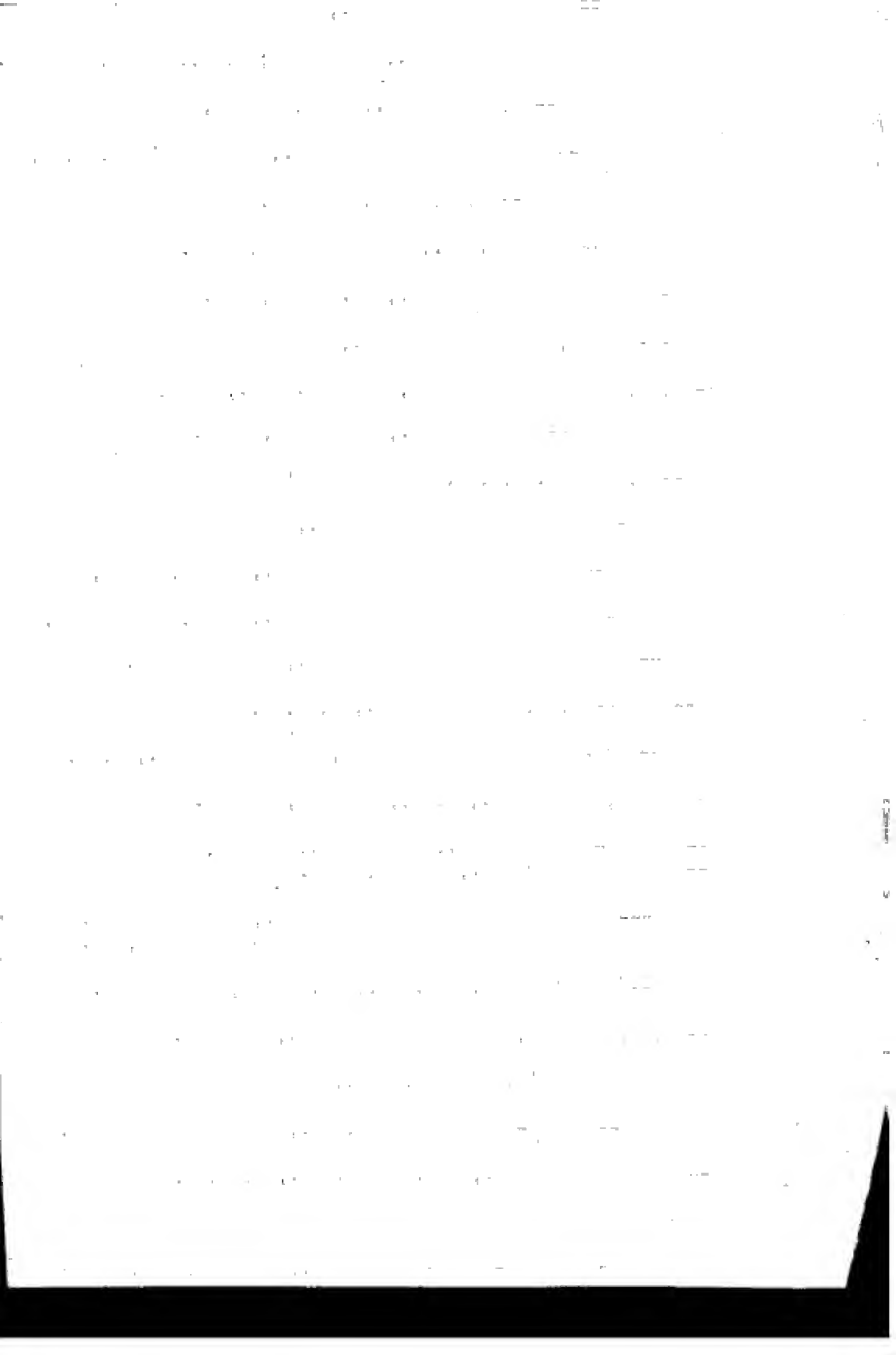
Light Diffuser Which may be Attached to High-Power Incandescent Lamps of Different Types to Shield One's Eyes from Brilliant Rays





- 1 - JAPANESE AQUARIUM-- Marshall Field & Co., Chicago
- 2 - BOTTLE TOP-- Heberling Novelty Co., Rochester, N. Y., 360 E. Main St.
- 3 - GLASS TOPS FOR TABLES-- G. E. Fox Co., 52 W. Kinzie, Chicago
- 4 - SECURITY POCKETBOOK-- Security Pocketbook Co., 1161 Broadway, N. Y.
- 5 - SLIPPER TREES AND HANGER-- L. N. Doud, Norwalk, Ohio-9 & W. main
- 6 - PIE CRUST CREMPER-- Ray Mfg. Co., North Windham, Conn.
- 7 - GARBAGE BAG-- Wayne Paper Goods Co., Ft. Wayne, Ind.
- 8 - TOILET CASE--- Bains, 1028 Chestnut St., Philadelphia
- 9 - CASTERS-- W. S. Ensign, <sup>Inc. 58. 19th St</sup> ~~Corporation, 141 5th. Ave., N. Y. C.~~
- 10 - CROSS STICH PATTERNS-- Cheshire Co., Worcester, Mass.
- 11 - CUP HOLDER-- B. Altman, N.Y.C., of Wanamaker's
- 12 - LIGHT DIFFUSER-- <sup>Supplied by Luminous Specialty Co. Indianapolis</sup> Varney Electric Supply Co., Indianapolis
- 13 - MEDICINE DROPPERS-- SNYDER Rubber Specialty Co., <sup>R/120,</sup> 139 N. Clark, Chicago
- 14 - ELECTRIC TOASTER-- Simplex Electric Heating Co., 15 S. DesPlaines, Chi
- 15 - REFRIGERATOR-- Belding-Hall Refrigerator Co., Grand Rapids.
- 16 - TOOTHBRUSH-HOLDER-- <sup>167 23rd St. 116 Bradford B. Bldg. Saranac Lake, N.Y.</sup> J. H. Witmore ~~X~~ Co., N. Y. C. 347 Pearl St.
- 17 - FOUNTAIN PEN--Invnt. by Michael Bernstein, Madison & 34th., N. Y. C
- 18 - BOOK END-- Fayer, Ruhl & Co., N. Y., Chicago, Boston.
- 19 - OVERALLS-- Hilker-<sup>1256</sup>Welchers Mfg., Mound Ave., Racine, Wis
- 20 - OIL STOVE-- National Stove Co., Lorain, Ohio.
- 21 - DRINKING CUPS--- Nuckell's Safety-First Cup Co., 409 Gould Bld. ~~Atlanta~~  
Atlanta, Ga.
- 22 - ANKLE SUPPORT--- Brauer Bros. Mfg. Co., St. Louis, 14th. & Pine.
- 23 - TEA SET--- W. A. Pickard, 4853 Ravenswood Ave, Chicago.
- 24 - COAT HANGER--- Ovington's, 314 5th. Ave., New York
- 25 - 'PHONE DESK SET-- ~~Teleph-Rady Desk Mfg. Co., 231 Insurance Exch. Bldg~~  
<sup>214 W. Van Buren St</sup> Chicago.
- 26 - SUITCASE--- Hartman Trunk Co., 2 E. 33 rd. St., N. Y. C.
- 27 - NAIL BRUSH--
- KITCHEN CABINET---Campbell-Smith-Ritchie Co., Lebanon, Ind.







# INTENDED FOR THE HOME AND ITS MEMBERS



This Refrigerator Has a Sliding Rack Fitted in a Special Compartment for Milk and Butter. Price of 100-Pound Size Is \$30



Family Toothbrush Holder with Separate Carded Space for Each Member of Household. This Size, 35 Cents



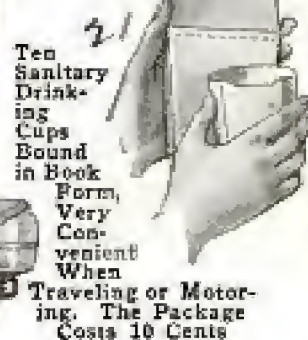
This Fountain Pen Has a Reservoir Which will Hold a Small Bottle of Ink. It is Not Yet on the Market



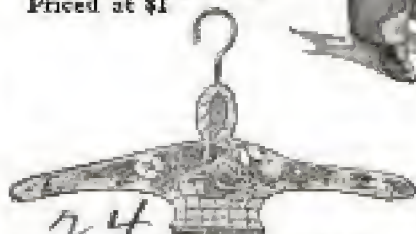
This Daily Decorated Book End Represents a New Handicraft. Ready for Decorating, It is Priced at \$1



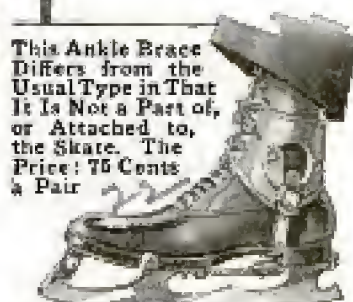
For Household Work as Well as for Tinkering with the Car, Overalls—Especially Designed for Women—Are Convenient. They Cost \$1



Ten Sanitary Drinking Cups Bound in Book Form, Very Convenient When Traveling or Motor-ing. The Package Costs 10 Cents



Even Coat Hangers can be Sightly, Not to Say Odd and Artistic, if One Wants Them. This "Flower Basket" Hanger in Colors Costs \$2



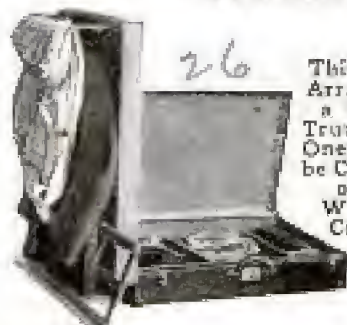
This Ankle Brace Differs from the Usual Type in That It is Not a Part of, or Attached to, the Skate. The Price: 75 Cents a Pair



Here Is a Decorated China Tea Set Which Is Distinctive as Well as Artistic. The Three Pieces are Priced at \$11

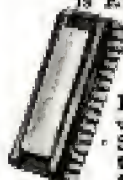


This Telephone-Deak Outfit Consists of a Directory, Two-Year Card Calendar, Filing Hook, Loose-Leaf Calendar, Tray for Clips, Pencil Holder, and Memo Pad. Price \$2.50



This Suitcase, Arranged Like a Wardrobe Trunk, Permits One's Clothes to be Carried without being Wrinkled and Crushed. The Price: \$25

New Kitchen Cabinet with Small Drawers Nested in One Big One Which Slides Forward When the Top is Extended



Nail Brush with Pumice Stone Fitted to Back. It Costs a Quarter





INVI:

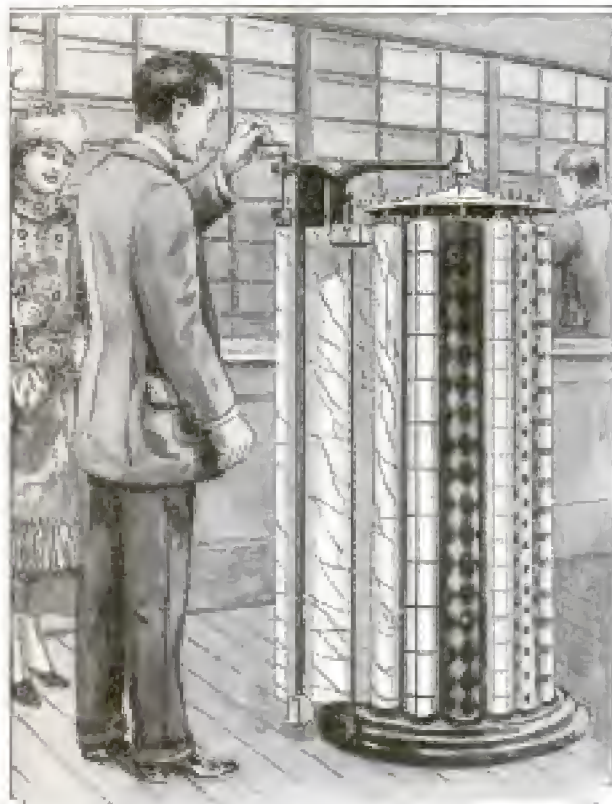
Dwight W. Johnson,  
Bethany, Neb.  
276 1602

S. F. Murphy, Gen Mgr.,  
Tonolow Mfg. Co.,  
Drogheda, Ireland,  
320000

POPULAR MECHANICS

## OILCLOTH RACK EQUIPPED WITH SPECIAL FEATURES

A convenient cylindrical rack for holding oilcloth has been invented, special features of which are a cutting



A Revolving Display Rack for Oilcloth, the Special Features of Which Are a Measuring and a Cutting Device

device and a measuring device. The rack has a capacity of 15 rolls, each of which stands on end and is supported by a rod passing through it. When a piece of material is to be cut the rack is revolved on its base until the selected roll is next to the cutting device, which is a part of the frame that holds the revolving portion upright. The free end of the cloth is fastened to a shaft and by turning a crank it is wound onto the shaft, together with a ribbon of paper. The latter is marked off in feet and inches and shows how much material has been unrolled. When the proper amount has been unwound, a knife, which moves along a guide, may be employed to cut off the material without removing the roll from its holder. Another feature of the rack is that it needs little floor space.

## TRANSATLANTIC PIPE LINE

### PROPOSED

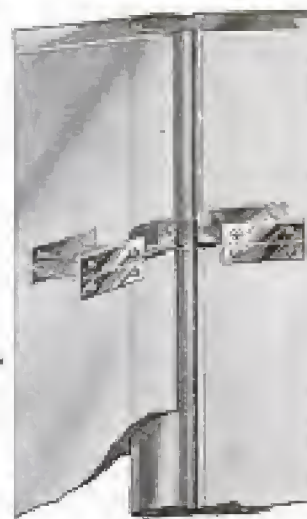
*TIMES* ENG. SUP. 9-20-16 (London)

An Irish manufacturer has prepared in detail a plan for laying an 18-in. submarine pipe line between the British Isles and America, which, according to estimates, would transmit oil to England at a small fraction of the present transportation cost. As proposed, the pipe would be made of steel ribbon on the helical-tube principle, so as to be flexible. The overlappings of the ribbon as it winds round and round itself would be packed with asbestos twine. The tube would be able to withstand an internal pressure of 2,000 lb. and an external pressure of 10,000 lb. per square inch. Around it would be woven a cotton casing coated with preservative. To give the pipe longitudinal strength a stranded steel cable would be put inside. Twenty vessels would be employed to lay the pipe, each being assigned to a 130-mile section. The scheme calls for an outlay of \$50,000,000. It is estimated that the transportation cost per 1,000 gal. per 1,000 miles would be about 50 cents. By tank steamers it is about \$50.

2505

## IMPROVED DOOR HINGE SAVES FINGERS

By the construction and arrangement of a door and jamb made possible with a hinge recently patented by a resident of Fort Worth, Tex. there is no crack or vertical opening left to catch and pinch the fingers of children or careless adults. The edge of the door is rounded to fit a corresponding jamb. The hinge proper is formed of metal plates having broad flat bodies or shanks, double side flanges with



M. B. Cunningham,  
1509 S. Lake St.

FORT WORTH, TEX.



Originals:

T. J. Hubbard

# POPULAR MECHANICS

277

1165 Cleveland St., Decatur Ill.

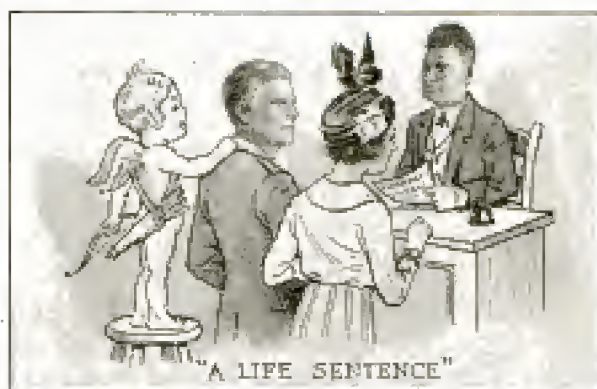
screw holes, and flat circular heads which overlap and are pivoted together by a rivet. When secured in place in kerfs cut in door and jamb, three of the hinges support the door firmly, and it may be easily detached if required.

3307

## PHOTOS OF FRIENDS ADDED TO COMIC POST CARDS

Comic post cards on which have been pasted tiny photographs of the sender, or his friends, are a novelty which has been introduced among the winter residents and the tourists of Jacksonville, Fla., and elsewhere. In preparing these cards the so-called "penny" photographs are used, which are about the size of postage stamps. The background of each photograph is cut away, leaving only the head and shoulders. This is pasted on the face

of the figure on the card. The adding of familiar faces to all sorts of bodies



Reproduction of a Comic Post Card Which has been Altered by Covering the Faces of the Two Men with Photographs of Friends of the Sender

produces the most laughable effects and by the exercise of ingenuity in posing for the pictures and in the selection of the cards a most amusing variety of caricatures can be obtained.

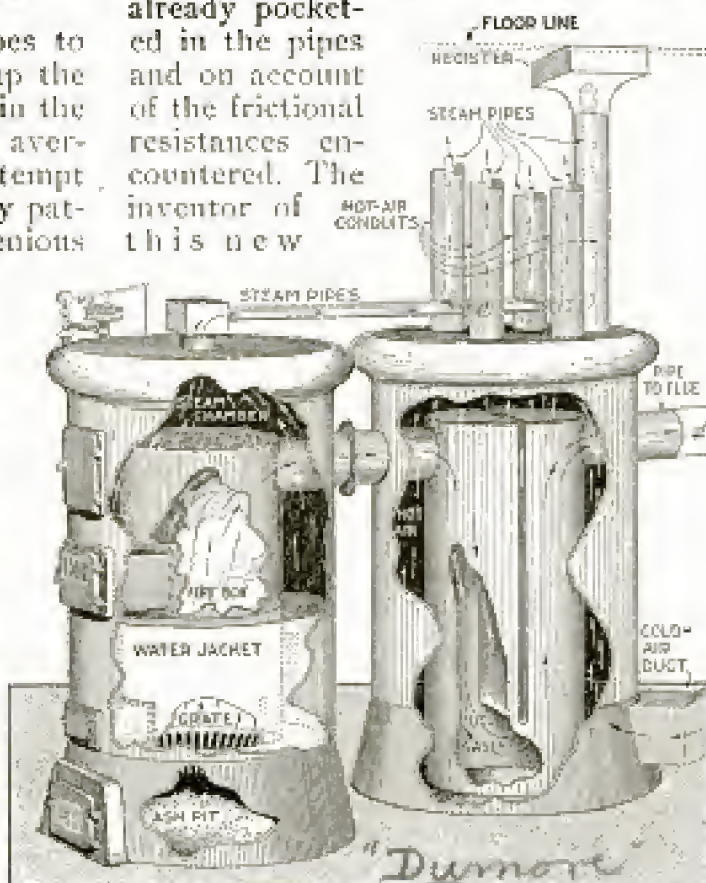
9650

## FURNACE COMBINES VIRTUES OF HOT AIR AND STEAM

In any furnace much heat goes to waste in the gases which pass up the chimney. Especially is this true in the coal consumers which inhabit the average householder's cellar. In an attempt to save some of this heat, a newly patented invention resorts to ingenious expedients.

The usual fire box is jacketed with a boilerlike vessel in which steam is generated. The waste gases from the boiler, instead of passing directly to the stack, are first made to go through a second apparatus, which, in general external appearance, at least, much resembles the first device. But here the gases pass through a long U-shaped tube, the large radiating surface of which permits much heat from the gases to be saved. This heat is conducted away to the various rooms of the house by galvanized-iron tubes in the usual manner. These, however, are only 4 in. in diameter, and hot

air will not ordinarily ascend such small pipes, because of the cold air already pocketed in the pipes and on account of the frictional resistances encountered. The inventor of this new



The Furnace is Divided into Two Compartments: In One Steam is Generated, from the Other Hot Air Rises to the Upper Rooms of the House

H. V. DEEMAR (INV.)

1372 Union St. (See Nov 1915-668)

ST. LOUIS

C/o Aluminum Ore Co. E. St. Louis, Ill.

Copyrighted material

1711" Dumore Heating & Ventilating Co. St. Louis Mo. 3/15/21



heating system, however, claims to have overcome this objection by running a  $\frac{3}{4}$ -in. iron pipe down the center of each air tube, the pipe having a suitable valve at its outer end to allow dead air to get out ahead of incoming steam. The steam in the small pipe comes from the boiler part of the arrangement and is for heating up the larger tubes, thus starting a current of hot air up the tubes. Both the virtues of hot-air heating systems and those of the steam variety are claimed for this arrangement.

3144

### AN ELECTRICALLY LIGHTED STOOL FOR SHOE STORES

A stool which in general appearance resembles those used by clerks in wait-



Shoe-Fitting Stool Equipped with an Electric Light in the Foot Rest, Which Affords a Customer a Good View of the Shoe Being Tried On

ing on customers in a shoe store, has been fitted with an electric light, so placed that the person trying on a shoe can get a good view of it without rising from his seat. The bulb is placed behind a window in the inclined end of the steel that serves as a foot rest. It is lighted by pressing the foot against a plate adjoining the lower edge of the window. The batteries which supply the light with current are concealed in the stool.

JUNE 6, 1916

Chas. C. Schlox, Kansas City, Mo.

PAT. 642 V. 2

Forest Service  
U. S. Dept. of Agric.  
Wash., D. C.

Wood

### MANY LITTLE-KNOWN USES FOR FOREST PRODUCTS

There is a far greater variety of uses for wood products than the public realizes and at the present time the discovery of new and interesting applications is progressing rapidly, through the efforts of investigators, many of whom are employed by our government. Powder for munitions or blasting, disinfectants for protection against disease, and artificial silk for clothing, are among the products obtained from wood in whole or in part. The acetone used as a solvent in making nitrocellulose powders is derived from acetic acid, a product of hardwood distillation. Black walnut is so much in demand for gunstocks that other woods, especially birch, are being substituted. It is stated on good authority that in Europe there is a shortage of willow for making wooden legs. The Forest Products Laboratory at Madison, Wis., has conducted extensive experiments in the production of grain, or ethyl, alcohol from wood and has had some success in raising the yield and lowering the cost of production. If this process can be put on a commercial basis it will make available for profitable use millions of tons of sawdust now wasted.

—3299

### COLOR SCHEME PREVENTS PIPES BEING CONFUSED

Because no less than 21 different kinds of liquids and gases are piped to various parts of the new building of the Massachusetts Institute of Technology, it has been found necessary to work out a color system for marking the pipes to indicate their contents. Without such a scheme it would be very possible for a person to tap an ammonia pipe, for example, when he intended to tap a water pipe. Altogether there are more than 50 miles of piping in the great building. In the big mechanical-engineering laboratory the various tubes are painted their entire length in the adopted color for each kind. Elsewhere the prevailing

Cambridge  
Mass

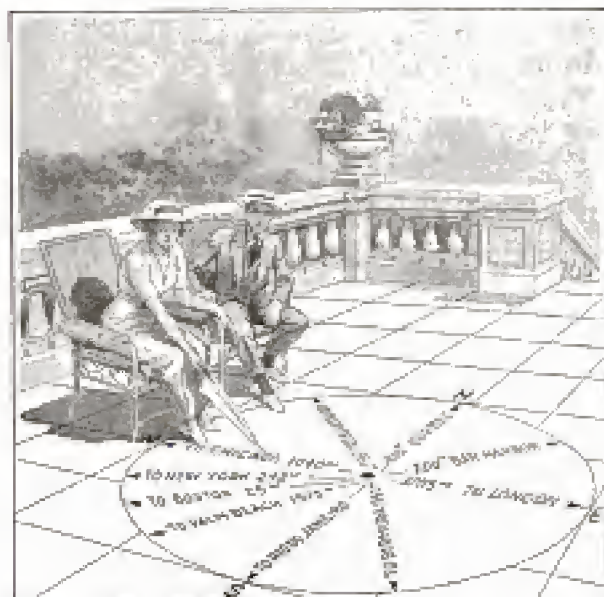


color is white, with little patches of distinguishing color at intervals. Pipes for water from the Charles River are painted emerald green; for the Cambridge domestic water supply, light blue, and for the filtered drinking water, light yellow. Other colors used are drab for compressed-air pipes; black or white for high-pressure steam pipes with another color at the joints; ultramarine for brine pipes, and light green for the sulphureted-hydrogen pipes.

3040

### DISTANCE TO MANY POINTS TOLD BY ODD HOTEL DIAL

A well-known hotel in Marblehead, Mass., has a large brass dial set in the floor of one of its verandas, on which are indicated the points of the compass and also the directions in which several important cities lie and their distance away. It shows, for example, that Montreal lies to the northwest approximately 340 miles away, that London is almost due east, 3,785 miles distant, and that 942 miles to the southeast is Bermuda. This unusual decoration in



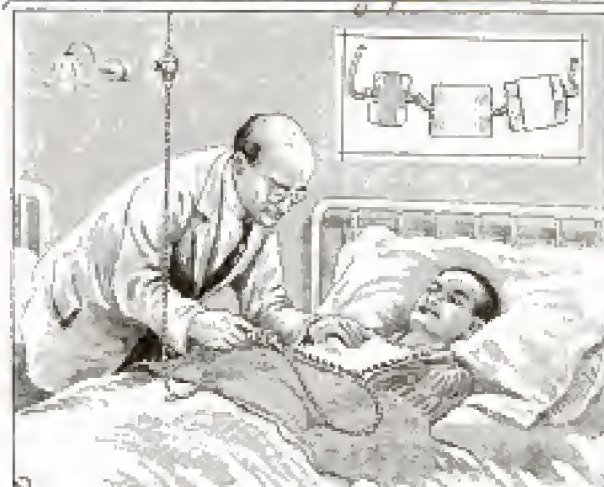
Brass Dial Set in the Floor of a Veranda of an Eastern Hotel, Showing the Points of the Compass, the Distance to Several Important Cities, and the Direction in Which They Lie

the floor of the veranda is a source of much interest to the guests of the hotel, who come from many quarters of the globe.

### PLIABLE ELECTRIC PAD HAS HEAT CONTROLLER

*Multicell Electric Co.*

Pliability and durability are two of several important features of an electrically heated pad which is now on 904 Sinclair Bldg., St. Louis, Mo.



Pliable Electric Pad Having a Regulator in the Cord Which can be Set for High, Medium, or Low Temperature. Three Heating Units are Shown in Insert. The One at the Left Has Asbestos and Metal Protection Removed

the market. It can be folded, rolled, and even crumpled up without putting it out of order. This article, which is intended as a superior substitute for a hot-water bottle, is made of a number of flexibly joined heating units inclosed in a flannel cover. These units consist of small squares of mica, about each of which a single strand of fine resistance wire is wound several times and attached to a large woven-wire band which joins the units. Each mica square is covered with asbestos and then with a band of metal to prevent short-circuiting or setting the pad afire. In the corner of the cover is a thermostat which prevents the heat from becoming excessive. Inserted in the electric cord is a controller which can be set for high, medium, or low temperature.

Government experimenters have recently produced a strong wrapping twine by twisting strips of paper into a cord. Its strength depends on the quality of the paper and the process of treatment. As yet means has not been found of protecting the paper cord against moisture.



# INTERESTING PICTURES OF CHILDREN



This Is Miss Becky Lanier, Aged 10, Who Is a Fine Horse-back Rider. In Many Horse Shows, Including the Recent One in New York, She Has Won Honors. When Her Horse Jumps the Hurdles She Knows Just How to Hang On



SHOOTING INTERNATIONAL FILM SERVICE

The Little Lad Above Is a Six-Year-Old Prince of India. Plots in His Father's House have Made It Wise for Him to Come to Canada, under the Care of the British Government, and Go to School. And This Is His Full Name: Narasingam Scindia Maharrata!

The Children Shown at the Left are Attending School on a Train. The Outside of Their "Schoolhouse" is Shown Below at the End of the Work Train. The Fathers of These Pupils Work on the Railroad Track, and as They are Transferred from Place to Place the Children Go with Them—but They Never Miss a Day of School

SHOOTING INTERNATIONAL FILM SERVICE



SHOOTING INTERNATIONAL FILM SERVICE



# The Militia of Mercy Mrs. John Hays Hammond, President.

AND THINGS WHICH CONCERN THEM

3393

This Ambulance has been Donated by the "Militia of Mercy" to Carry Children Stricken with Infantile Paralysis to Hospitals, After being Christened in New York It was Driven to Boston and Put into Service

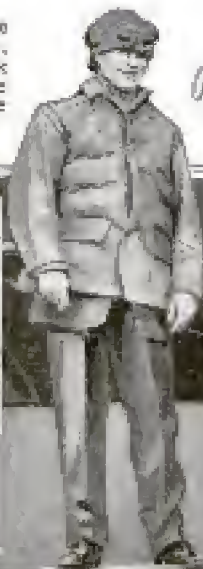


Here is a Picture of Baby Ellen Anderson, Herself an Infantile-Paralysis Cripple, in New York City, Christening with a Bottle of Milk the Ambulance Shown Above  
Oct 1, 1916



It is Said That in a Village North of Saloniki, Greece, There is Just One Turk Left, and He a Little Boy. Here is a Picture of Him, Fex, Baggy Trousers, and All

The Little Fellow at the Right is Probably the Youngest Person in America to Ride in an Airship. Billy Thomason is His Name and He is Only 20 Months Old. He was All Bundled Up Like an Airman. Even to Goggles, and Then Johnny Green, Starting at St. Petersburg, Florida, Took Him for a Ride in the Sky



*Arrival age Oct 9/16*





IN V.  
 Geo M. Rogers,  
 7918 Marquette St.,  
 Chicago.  
 282 2837

# Geo L Goodale  
 So. State Union of Optometry  
 Lenox, Ia.

A. E. IVERS, 5605 Princeton Av.  
 A. J. JOHNSON, 5229 MORCANT ST.

# ELECTRICALLY OPERATED OILER PROMOTES SAFETY

An electrically operated oiler has been patented which makes unnecessary the often dangerous practice of

An Oiler which is Opened and Closed by Means of an Electric Switch: It Makes Unnecessary the Often Dangerous Practice of Oiling Running Machinery by Hand

oiling machinery by hand while it is running. Where this invention is used oil is fed from a central tank into as many oil cups as are needed. Each cup is connected with an electric circuit and has a valve that is closed by a small plunger. The circuit is operated by a switch within easy reach of the person in charge of the machine. By closing the switch a small magnet just above each oil cup is energized. This instantly draws up the plunger and so the oil is allowed to flow down into the bearings. As soon as the current is turned off, the plunger drops down again and the oil stops flowing. If desired, the switch can be operated by clockwork. While the installing of this device on machinery would involve extra expense, it is not thought that the

additional outlay would be considered excessive, particularly for types of machinery on which safety devices are of prime importance.

3261

# TEN STATES HAVE NO LAWS ABOUT FITTING GLASSES

That the fitting of glasses for the eyes is today regarded as a profession requiring special knowledge and skill is shown by the fact that all but 10 states in the Union have laws requiring all persons engaged in this work to be duly registered. In two of the 10 states which have no laws on this subject, the matter is now before the state legislatures. These commonwealths are Ohio and Pennsylvania. The eight remaining states are: Wyoming, Texas, Louisiana, Mississippi, Alabama, South Carolina, Kentucky, and Missouri. While the optometry laws of the country are far from uniform, there is apparent a tendency to elevate the standards of the optometrist's profession and in some states all applicants for certificates are subjected to examinations that are quite rigid.

2951

# TURBINE FAN A FEATURE OF NEW SPARK PLUG

A spark plug which is constructed along decidedly new lines is equipped with a turbine fan loosely mounted on a rod that extends down through the center of the plug. The compression and explosion of the engine cause the fan to rotate rapidly. From the extremity of each fan blade hot sparks are delivered to the bushing. This arrangement not only provides a larger spark area, but is also designed to insure ignition. It is to a large extent self-cleaning, as the fan automatically throws off soot and oil deposits. All the parts are substantially built.

Fan - Fire Spark Plug Co.  
 YONKERS  
 N.Y.

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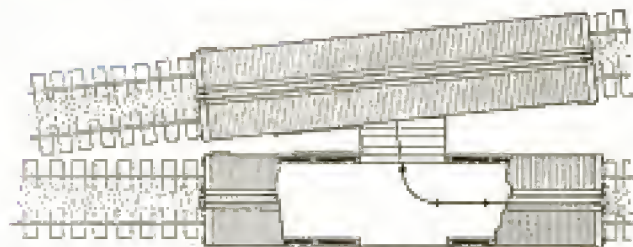
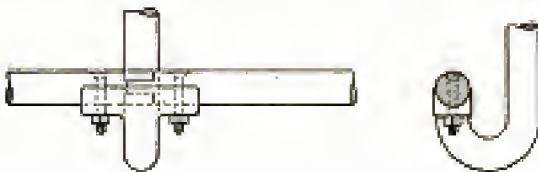
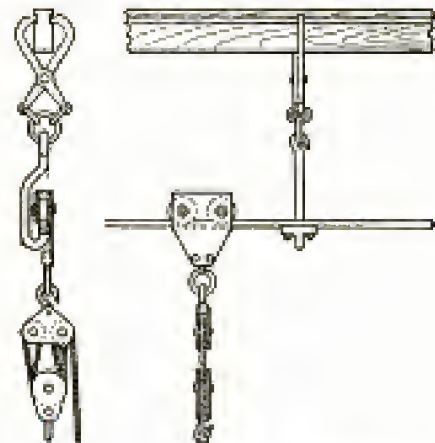
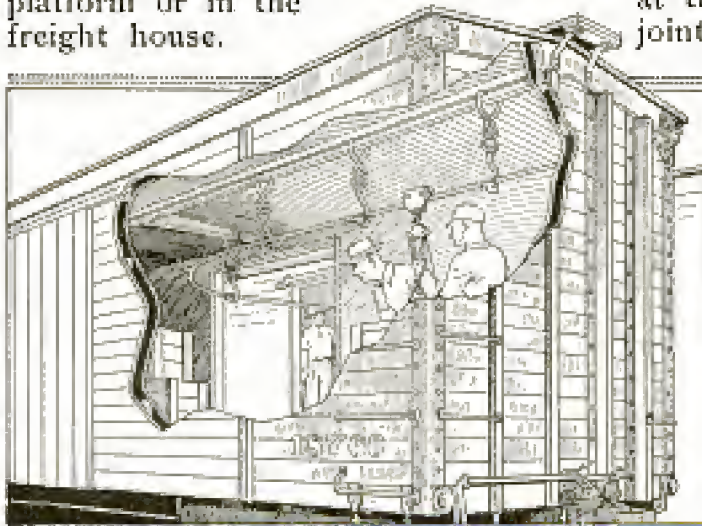


## Portable Trolley and Tackle for Freight Transfer

By JOHN W. SHANK

**R**APID and economical loading and unloading of merchandise freight between platforms and railroad cars was accomplished by fitting a portable trolley and tackle into the cars and above the adjoining platform, as shown in the sketch. Heavy packages and crates of goods ordinarily requiring the use of a truck are handled in this way with ease. A sling, or grabhook, is fixed around the load, which is raised from the floor by means of the multiple-pulley block and rope. The rope is locked and the load transported to its immediate destination on the loading platform or in the freight house.

The trolley is supported by means of tongs set into grooves cut in the ridge pole of the car roof, as shown in the detail sketch at the right. The hooks which support the trolley are of forged steel, curved as shown, to fit the trolley wire or rail, and to give clearance for the passage of the hanger. The trolley rail is built up of sections of round iron rod, jointed with a tongue and groove at each joint, and bolted to the hooks with flat-head bolts, as shown in the detail sketch at the left. The rigging may thus be "knocked down" for convenient removal. The curved sections at the turns in the rail are similarly jointed to the main trolley rail, a sup-



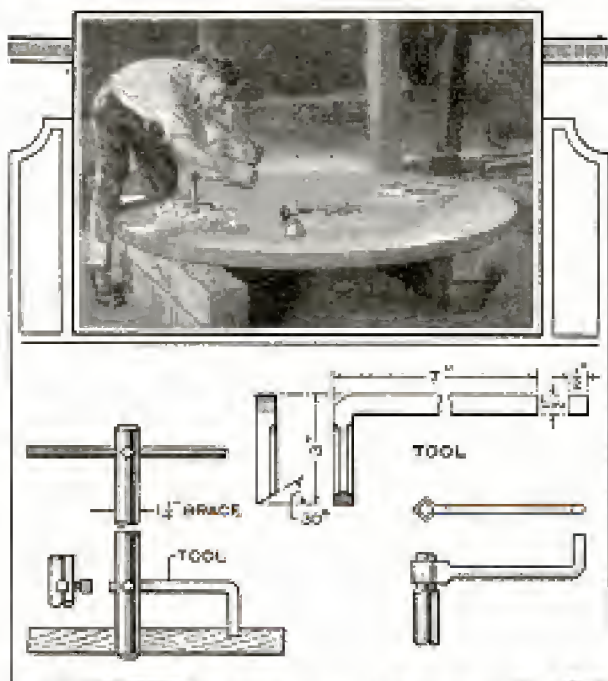
This Portable Rigging for the Handling of Package Freight Saves Time and Physical Energy of the Workmen



porting hook being set at each joint, about 4 ft. apart. The upper sketch shows the device in use in a freight car, and below is shown the use of the rigging between two freight cars, on adjoining tracks.

### Tool for Boring Large Holes in Wood

It is sometimes necessary to cut large round holes through heavy flooring, wooden partitions, or wooden



This Tool was Made to Bore Large Round Holes in a Tank Cover, and Has Many Uses

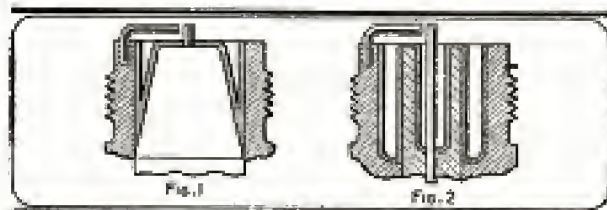
tank covers. With a saw it is difficult to cut a smooth circular hole, and a more accurate tool is required. Such a tool, designed to cut holes 5 to 12 in. in diameter, is shown in the illustration, and is made as follows: Heat a bar of tool steel,  $\frac{1}{2}$  by  $\frac{1}{2}$  by 10 in., to a cherry red; bend it at a right angle, 3 in. from one end, and temper it. The brace is made from  $1\frac{1}{4}$ -in. round bar stock, and its length should suit the work to be done. Drill a  $\frac{1}{2}$ -in. hole through the bar, 4 in. from one end, squaring it afterward with a file, so that the tool may pass through with a snug fit. Perpendicular to this hole, drill and tap a hole for a  $\frac{3}{8}$ -in. set-screw. At the other end of the brace, drill a  $\frac{1}{2}$ -in. hole, and fit a round-bar handle through it.

To cut a 10-in. hole, for instance, through a wooden floor, bore out a  $1\frac{1}{4}$ -in. hole in the exact center of the circle laid out. Then set the tool so that it will be 5 in. from the extreme cutting edge to the center of the brace, and cut out the disk in the center. In the photograph reproduced, holes are being bored in a hard-maple cover, 3 in. thick, for a large tank. As these holes had to be accurate within a small fraction of an inch, they could not be sawed out, and the above described tool was designed and used with excellent results.—K. M. Coggeshall, Webster Groves, Mo.

### Kinks in the Care of Spark Plugs

The failure of a spark plug is one of the most frequent troubles with the automobile engine, hence the autoist should know what to do when this occurs. When the spark plug misses; or fails to fire, the engine is out of tune or balance. This condition is instantly noticed by the irregular vibration set up in the car, and by the loss of power. Generally the trouble is caused by the plug becoming short-circuited through the collection of carbon on the porcelain of the plug. This is termed sooted or dirty, and is caused by several conditions. The carburetor may be out of adjustment, giving too rich a mixture, or there may be too much oil in the cylinder. These possible causes should be looked into if the trouble is chronic.

If the plug is found to have a black



Typical Sections of Spark Plugs, Showing How Carbon Collects on Surface, Causing a Short Circuit

coating clean it thoroughly so that the porcelain is white, and the points quite clean. It will make cleaning easier if the plug is soaked in wood alcohol. Then take a sharp-pointed tool, a knife



answering very well, wrap a piece of rag around it, and scrape the plug all over, getting down into the recesses.

There are various types of plugs, the most common being the porcelain, shown in Fig. 1. The inclosed type of plug will fire longer without the need of cleaning, but it is hard to clean, as it has to be taken apart. When a plug is taken apart, great care must be taken to see that the porcelain is not broken, and when reassembling it, all the joints must be made gas-tight. Fig. 2 shows another type of plug, the possibility of short-circuiting by carbon deposit being indicated.

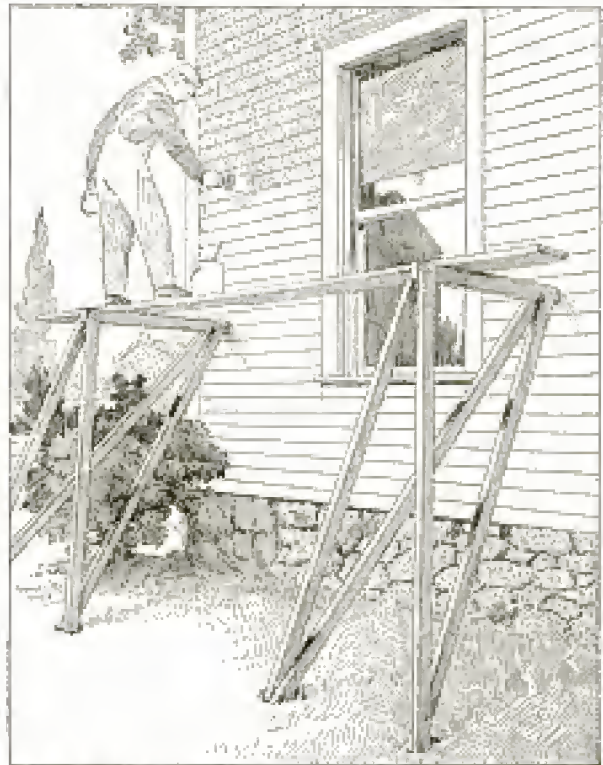
The modern plug is so made that it will not come apart, and, while it is a little harder to clean the individual parts when they cannot be handled separately, it is not so much trouble in the long run, as it is hard to put the other type together again properly. The insulator of a plug sometimes cracks, and even though it be but a minute crack, it must be thrown away, as the carbon seeps in quickly, and the plug will not fire.

When buying new plugs be sure to get the type that is made for the particular engine to be fitted. In addition to the numerous special plugs, there are two sizes of hexagons in use, one  $\frac{7}{8}$  in. across flats, and the other  $1\frac{1}{8}$  in. across. It is annoying to find that the spark-plug wrench will not fit the new plug intended for use, especially so when one cannot get at the plug to turn it with an adjustable wrench. It is a good plan for the autoist to carry an extra set of spark plugs, so that in case of failure on the road the bad one may be replaced without the necessity of cleaning plugs until the return to the garage is made.

### Movable Scaffold for Building and Painting

The supports for a scaffold shown in the illustration will be found more convenient in many cases than the use of a ladder, or of brackets fastened to the side of a building, to provide a support for workmen. They are made of

2 by 4-in. stuff, and should be arranged so that the lower ends are slanted away from the building sufficiently to pre-



These Supports for a Scaffold Are More Convenient than the Use of a Ladder, Especially for Work at a Comparatively Low Height

vent their slipping, and if desired, for use on smooth footings, braces which can be spiked down may be fastened to the lower ends of the supports.—James R. Townsend, Itasca, Tex.

### Casters on Footboard for Use in Auto Repairs

One of the footboards in an automobile may be converted into a convenient device

for use in repairing or examining the under parts of the machine. The board is fitted

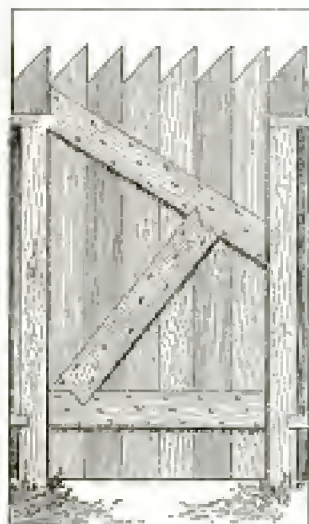


with four casters, as shown in the sketch, and these enable the workman to rest on the board and shift easily under the car. The device is always available, as it is fitted into its place in the floor of the car when not in use otherwise.—Louis S. Niper, Beach Park, Conn.



### A Nonsagging Board Gate

The usual method of bracing a gate built up of boards is to fasten horizontal

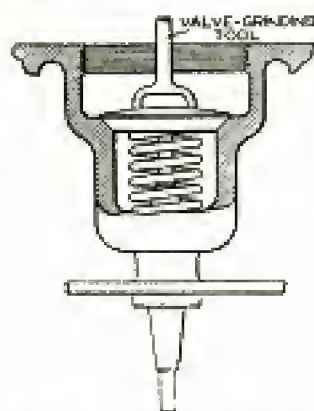


cleats across it, one near the top and another near the bottom, and a third diagonally between them, forming a Z-shape. This is often unsatisfactory in that the gate sags easily by strain in use, as well as from its own weight. A better method of disposing the braces is shown

in the sketch. This was tried out with success, the gate withstanding unusual strain. The lower brace is placed horizontally across the boards and well nailed. The upper brace extends diagonally downward and is notched into an intermediate brace, which in turn is notched into the lower one. The hinges are fastened to the edge, at the left of the sketch.—C. F. J. Charliss, Houston, Tex.

### Spring Aids in Valve Grinding

In grinding gas-engine valves, it is imperative that the stems be lifted frequently from the seating in the



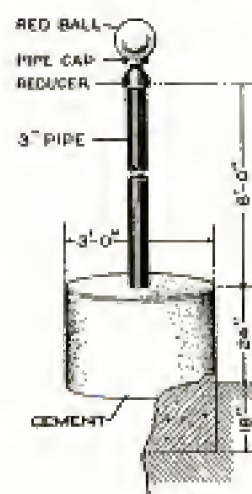
cylinder to insure an even distribution of the abrasive material. If the valve is not lifted from time to time, the emery or carborundum dust and oil are apt to form in

small pellets, producing deep grooves in the valve head and seat, which are hard to remove by grinding. The usual method is to lift the valve stem with one hand, while oscillating

it with the other. A coil spring of moderate tension, placed under the valve head, as shown in the sketch, will lift it automatically whenever the pressure is released from the grinding tool. Only enough pressure to keep the valve head seated, against the resistance of the spring, should be applied.—Victor W. Pagé, Bristol, Connecticut.

### Inexpensive Traffic-Light Post

A traffic-light post that is practical and inexpensive is shown in the sketch.



It is set in a concrete base providing the "isle of safety" and a 10-in. red-glass light globe is supported on an 8-ft. section of 3-in. iron pipe. The connections are made with standard reducers, and the globe is fitted into a 4-in. pipe cap. The wiring is conducted to the globe through

a conduit connecting with the post. The pipe cap which holds the globe is drilled and tapped for small machine screws, which hold the globe in place.—H. G. McQueen, Dow City, Ia.

### Skidding a Heavy Boiler or Machine

The moving of a heavy boiler or a large machine without the use of special appliances is sometimes a difficult task. A good way to handle this job is to build a wooden cradle around the object to be moved and mount this on two heavy wooden runners, resting on a well-greased plank. A few other greased planks should be in readiness so that when a couple of teams are hooked to the cradle and it starts to move, the planks can be laid as required just in advance of the runners. The planks may be used repeatedly.—James Skelton, Toronto, Can.



# A Sanding Drum for the Wood Shop

by Charles A. King

A WIDE range of woodwork to be smoothed may be handled to advantage on a sanding drum like that shown in the illustration. It is of simple construction and can be made easily even in a small woodworking shop, the only special fittings required being the shaft, flanges, bearings, and collars. These are readily available from machinery-supply houses, or may be obtained from old machine parts. This machine was used in a job shop for the sanding of ordinary building trim, elaborate bank fittings, and even for high-grade furniture. Flat work, curved pieces of a radius larger than that of the drum, and the edges of stock may be sanded on it, by the use of the table or the edge-sanding rest. The drum revolves in the direction indicated by the arrow at a speed of 600 revolutions per minute. It is driven by a 3-in. belt over a 10-in. pulley, set on the shaft, and an idle pulley provides for shutting off the machine temporarily.

The single table above gives greater freedom of use, and was determined upon after two tables had been tried. Care must, of course, be exercised in sanding work so that the operator may not be endangered by the drum. It is desirable, also, to provide a drive that will leave the top of the drum and the table free from obstructions, and permit the operator convenient access in handling large pieces. The table serves merely as a rest for the stock as it passes over the drum.

The drum is supported in a frame made of hard wood. The legs are of  $2\frac{1}{2}$  by 4-in. stock, braced by 2 by 4-in. pieces, mortised into them, and pinned at the joints with  $\frac{5}{8}$ -in. maple pins. The members A, which carry the drum shaft, are of  $2\frac{1}{2}$  by 4-in. stock, and are fixed to the legs by mortise-and-tenon joints, as shown in the side view, Fig. 2. The edge-sanding shelf B extends slightly beyond the members A, as



shown, and should be set carefully on wedges, so that the center of a  $\frac{7}{8}$ -in. board will extend on a line with a radius of the drum, as indicated by the dotted line at B. To insure accurate edge-sanding on stock of other thicknesses, it is necessary to build up on the shelf so that the edge will not be "out of square."

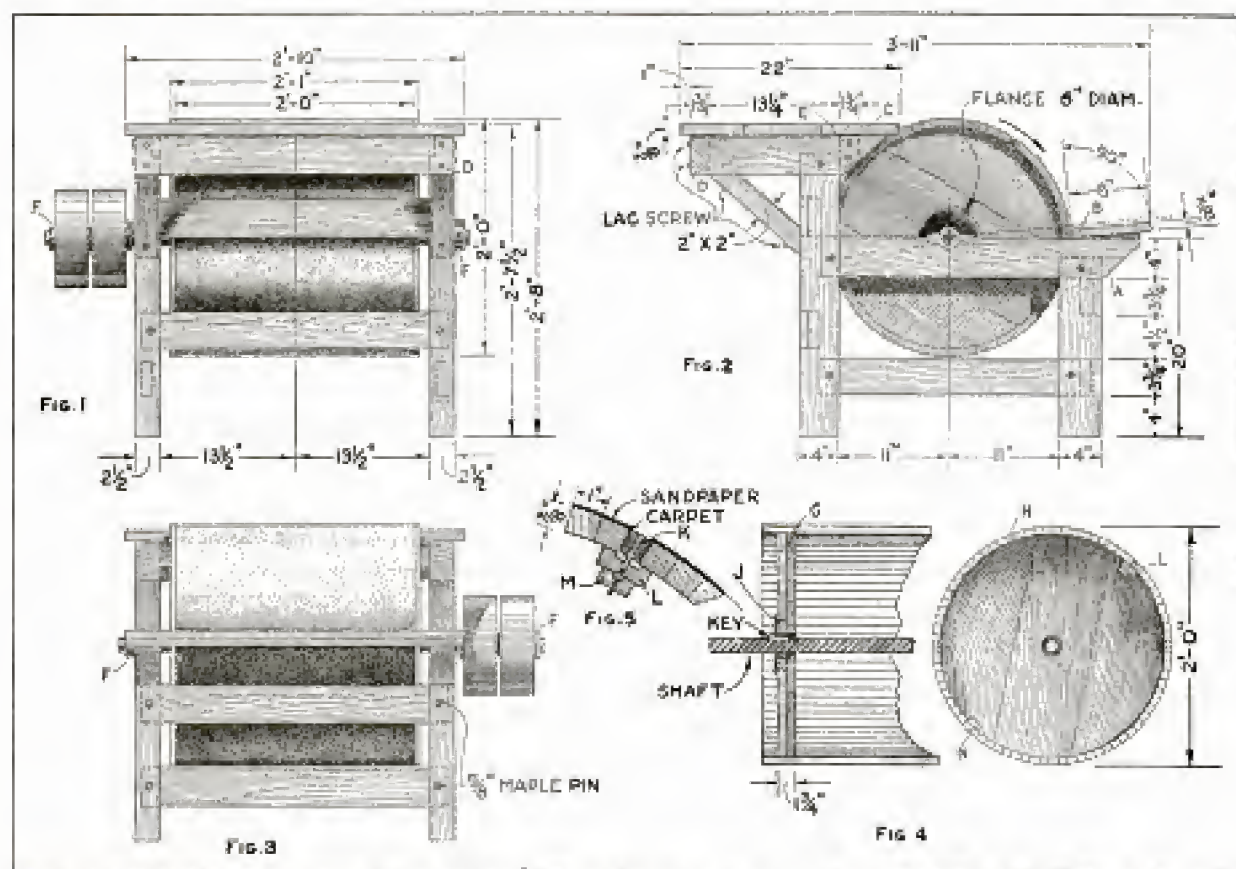
The table C is built up on a frame of  $1\frac{3}{4}$  and  $2\frac{1}{2}$  by 4-in. stock, fastened at the joints with lag screws, as indicated in Fig. 2, at D and at E. The brace at E is shouldered into the side rails of the table, and its lower edge is beveled to accommodate the drum. The table is braced against the rear legs with 2 by 2-in. pieces, fastened with lag screws. It is 2 ft.  $7\frac{1}{2}$  in. from the floor, and the upper edge of the drum projects  $\frac{1}{2}$  in. above it.

The drum is carried on a  $1\frac{3}{4}$ -in. shaft, keyed to flanges, J, Fig. 4, which in turn are fixed to the drum ends G, with screws. The shaft rests in split bearings, set into the supporting member A. Side motion of the shaft in the bearings is prevented by collars between the flanges and bearings, and set collars, F, Fig. 1, on the ends of the shaft. The body of the drum is built up on the drumheads G, which are of two layers, cross-banded to insure great strength, necessary at the considerable speed of operation. The sanding surface is built up of small strips, H, cut so that their edges are in line with radii of the drum end. The pieces of the drumhead must be fastened together firmly with screws or



bolts, riveted so that the nuts cannot become loosened accidentally. Cut the drumheads out approximately to

The sandpaper is drawn taut and clamped in place by means of the clamping strip K, shown in Fig. 5. The



This Sanding Drum Has a Wide Range of Usefulness and can be Made Readily in the Wood Shop at Small Outlay

their finished size. Cut the keyways in the bearings of the flanges and mount the flanges upon the drumheads. Then turn the heads down carefully to their exact finished diameter, which is 1 ft.  $10\frac{1}{4}$  in., if the staves of the drum are made  $\frac{7}{8}$  by 1 in. To do this, set them on the shaft together at one end, keying them, and apply the power by means of the pulley and belt. End motion of the shaft is prevented by the use of the set collars F, which are brought up against the bearings. Place the ends in position and nail the staves in place, setting the heads of the nails carefully, or countersink the screws, if this form of fastening is used. The staves should be of pine or whitewood, fitted tightly, and glued in place as they are fastened.

The sanding surface of the drum is covered with a layer of Brussels carpet, and the sandpaper is placed over this, the carpet providing a cushion.

The sandpaper is drawn taut and clamped in place by means of the clamping strip K, shown in Fig. 5. The strip is fitted into a groove so that, when the carpet and sandpaper layers are in place, the upper surface of the strip is just below the surface of the drum, never above it. The strip should be tapered only very slightly, if at all, the sides of the groove being parallel with those of the strip. The lower edge is rounded to prevent tearing the sandpaper. The strip is held in place by flat-head bolts screwed into nuts set in a strip M, fixed to the inner side of the drum. The bolts can thus be released from the outside by means of a screwdriver. They are held snugly in the strip L, being only loose enough to be turned without difficulty.

The clamping device must be counterbalanced by a strip on the opposite side of the drum, as at N, Fig. 4. The clamping device as well as this strip must, of course, be fastened in place before all of the staves are glued finally. They may be fastened tempo-



rarily with screws, and glued in place when the balance strip and clamping strip are in position. The clamping strip and its bolts should then be removed and a strip of the same thickness as those used for the drum should be fixed into place in the groove. The surface of the drum must next be turned smooth, using the machine as a lathe, and removing only as much stock as is necessary. The strip in the groove prevents the breaking of the edges at that point. The surfacing of the drum must be done with great care, for if it is not straight and true, the sandpaper will bubble and crack before it is worn considerably. The ends of the staves should be trimmed off to the proper length by turning. The drum should be in perfect balance to insure good results, and, if necessary, holes may be bored in the heavy side of the drumheads, or weights fastened securely to the lighter side, to correct fault on this score.

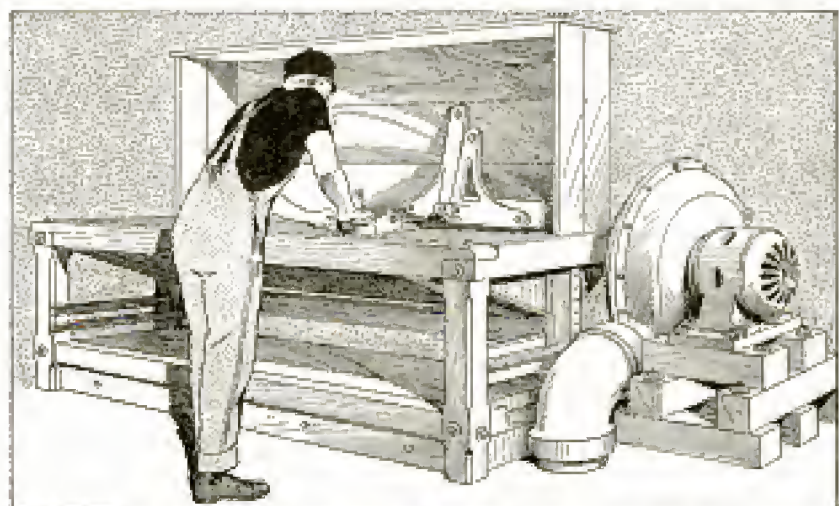
The carpet backing for the sandpaper is stretched over the drum and nailed into the clamping groove. The sandpaper is stretched over it, sufficient length being allowed to permit the sandpaper to pass under the clamping strip and against the opposite side of the groove. Slots are cut in the sandpaper to accommodate the bolts in drawing them up firmly. The first sheet of sandpaper should be fitted carefully, and others may be patterned from it. It is desirable to stretch the sandpaper over the drum on a damp day, as it will contract with dry weather, giving a better sanding surface. The paper should never be moistened in applying it, as this ruins it for use in sanding. For ordinary work No. 2 sandpaper is used, and for smoother finishes finer grades may be applied. The machine may be given an oil finish or painted a suitable color. A convenient method of fixing it to the floor is by the use of angle irons.

### Exhaust Fan for Workbench Aids in Removing Dust

Before painting iron castings, or secondhand machinery, it is necessary to remove the rust and foreign substances from the surface. During the cleaning process, the detached rust particles, floating about in the air, are inhaled by the workman, lodge in his eyes, and settle on his clothing. This metallic dust is also injurious to the bearings of machinery which may be near by, to say nothing of its settling on finished or wet painted surfaces. A simple suction device was fitted to a workbench, as shown in the sketch, to eliminate these bad features.

The workbench was constructed with

an iron grating for the working surface, instead of the usual board top. An air-tight, boxlike inclosure was then built below the grating, with the bottom sloping downward. At one side an exhaust fan, driven by an electric



Dust from Cleaning of Castings is Drawn Away through the Grating in the Top of the Bench, Thus Protecting the Workman

motor, was set, and the inlet side connected with the bench inclosure. The exhaust from the fan was piped outside

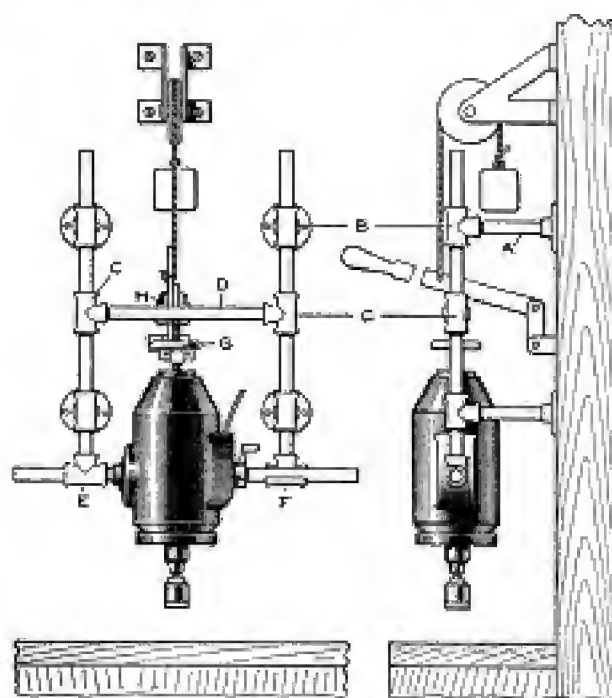


the building. With the fan in operation, castings are placed on the grating and brushed or sandpapered without inconvenience to the workman. The dust and rust particles are drawn downward through the grating. Such a bench is suitable for use in the removal

of old coats of paint, to clean up machinery parts, or even to finish the surface of woodwork. If chipping or grinding is done, it will be necessary to put up a back stop, as shown, to keep small particles from flying across the room and injuring other workmen.

### Portable Electric Drill Used as Drill Press

Many shops are provided with a portable electric drill, which is a necessity for certain kinds of work, but not



This Frame of Pipe and Fittings Enlarged the Range of Usefulness of a Portable Electric Drill Needed Only Occasionally

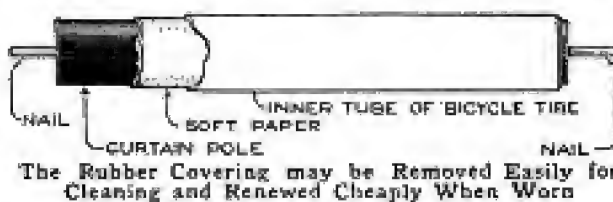
used often. The frame shown in the illustration was made to fit a drill of this type, and extended its usefulness to the many kinds of work ordinarily done on a small drill press. Most of the parts of the support and mechanism were made from pipe and fittings. The machine is fixed to a frame of wood, which supports a table on which the work is rested. The wooden support may be arranged so that it can be moved without taking the drill and fittings from it. The drill is supported in a frame which is raised and lowered by means of a lever, fixed to a counterweight.

Four standards, A, made of a section of 1-in. pipe, a flange, and a tee are fixed to the wooden frame. The frame of pipes and fittings which carries the drill is made of pipe of an outside diameter to slide closely in the tees, B, of the standards. Tees, C, are fixed solidly to the center brace D, and the sections of pipe joined to them. The shaft of the drill is rested in a tee, E, and in the tee F, which is cut open so that the shaft may be removed readily. The drill is held securely between the brace D and its bearings by means of the handwheel G, operating on a threaded rod set into a lug on the lower side of the brace.

The handle and its fittings are made of strap iron. The range of the drill is limited by the movement of the handle, which is fitted to the brace D by means of a shoe, H, in which it slides. The counterweight cord is fixed to the handle and passes over a pulley set in a bracket above the pipe frame.—W. A. Ready, Boston, Mass.

### Substitute for a Small Printing-Press Roller

The roller on my printing press became so marred that it could not be used with satisfaction, so I made one which was quite efficient. It can be



The Rubber Covering may be Removed Easily for Cleaning and Renewed Cheaply When Worn

cleaned easily and was made of materials which are easily obtained. I sawed a piece of curtain rod to the proper length and drove a nail into each end as a bearing, cutting off the



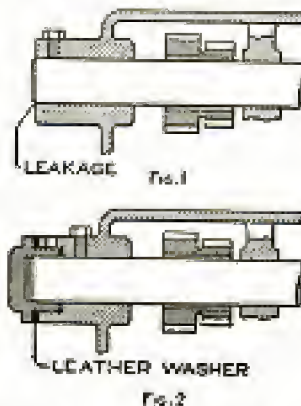
head. Several layers of soft paper were pasted around the roller, as shown in the sketch, and the inner tube of a bicycle tire was then fitted over the roller. The rubber tube can be removed quickly and cleaned, or renewed if desired. Hand rollers may also be made in this way by fitting a handle on the nails at the ends of the roller.—P. F. Harper, Danville, Va.

### Soldering Patches on Tanks or Large Objects

The soldering of patches on tanks and other objects that cannot be taken to the workshop readily is often difficult. The following method overcomes most of the objectionable features: First shape a patch by pressing a piece of tin somewhat larger than the opening, with the ball of a hammer, leaving a small flange around the edge. Tin both the patch and the part to be soldered; fill the hollow in the patch with melted solder and permit it to cool. Then using a pad, or heavy glove, place the patch in the hand, melt the solder with the soldering copper and apply the patch. Sweat it into place in the usual manner.—Charles Straughan, Sprague, Wash.

### Automobile Gear-Box Repair

Trouble was experienced on the gear box of an automobile in that the grease leaked, as shown in Fig. 1. The boss at the left, as indicated in Fig. 2, was tapped, and a brass plug was inserted to cover the end of the shaft. This necessitated shifting the locking screw, as shown in Fig. 2. The tapped hole formerly necessary for the locking screw was plugged. A leather washer was fitted at the end plug to insure a tight joint.



### Portable Safety Platform for Telephone Linemen

To provide utmost safety in handling telephones on private lines when carried over the same poles as are used for electric-power wires, a simple and effective portable safety platform was devised, as shown in the illustration. It is constructed of wood, about 1½ in. thick, 14 in. wide, and 18 in. long, cut out at the inside edge to suit the average standard pole for heavy line service, and insulated with rubber or other suitable material. Two straps are attached to the platform at the inner side to reach around the pole, and are provided with a strong buckle for ready and substantial fastening. A spike driven into the pole serves to keep this support in place. At the outside edge, two heavy leather straps are also provided to carry the weight of the operator on the platform.



The platform is ordinarily used about 2 ft. above the grade, to suit the regulation height of the telephone attached to the pole by means of a strap at a point about 9 ft. above the ground. This platform proved of great value in eliminating the constant danger of electric shock when using the private telephone lines of light and power companies, sometimes exposed to contact with high-voltage transmission lines.—L. R. W. Allison, Newark, N. J.

Caliper a bored hole at several points in its length, as the size at the opening may be misleading.



### Oil-Burning Blowtorch for Sheet-Metal Work

The torch shown in the illustration was designed for use in railroad shops on boiler, tank, freight-car, and other heavy sheet-metal work. By means of it a powerful flame may be directed on a limited area. The device is simple in construction, convenient in operation, and comparatively light. The oil fuel is admitted through the upper pipe, at the right, and the air for the blast through the lower pipe, the flow being controlled by  $\frac{3}{8}$ -in. globe valves. The pipes are braced near the torch and form a strong grip for the operator. The torch proper is a coil of  $\frac{1}{4}$ -in. wrought-iron pipe, fixed into a brass collar, having holes through it, as shown in the detail sketch, and covered with a  $2\frac{1}{2}$ -in. wrought-iron pipe, from which the flame is projected.

The upper sketch shows the general-assembly drawing of the torch; the details are shown in the lower sketches. The cover for the coil is 11 in. long over all. One end of it is fitted with a brass plug, shown in detail at the center, below. Inside of this plug is a second brass plug, shown at the right, and into this are fixed the supply tube and the coiled pipe. The dotted lines in the upper view show how the flame

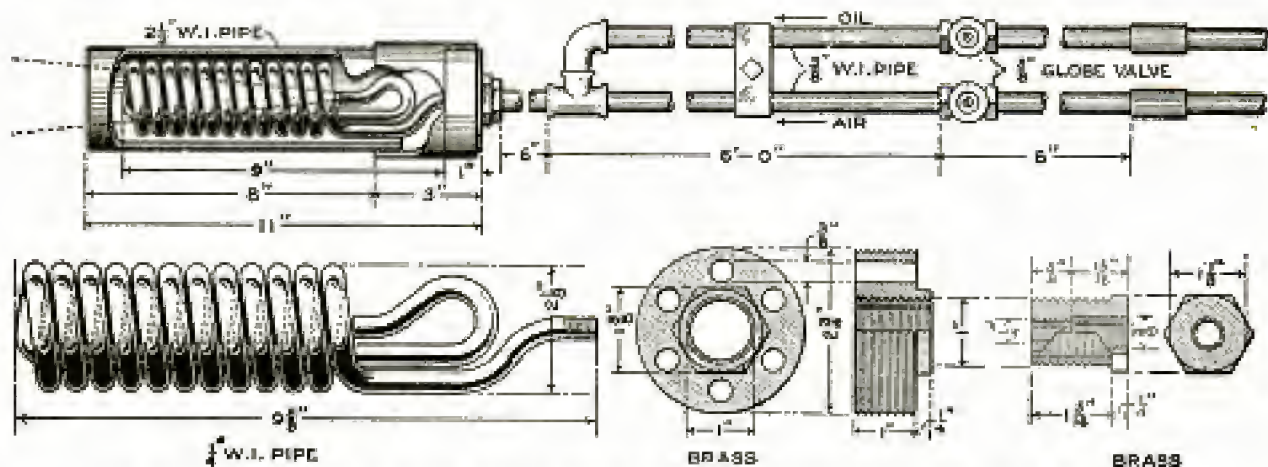
is heated to the proper temperature for ignition in passing through the coil, and the flame passes out through the center of it.

### Cutting Threads without Tap or Die

Requiring a thread on a small piece of copper wire and a nut to fit it, I found that no tap or die was available. A piece of spring brass was drilled to a size slightly smaller than the wire, and a small rat-tail file was forced into it by gradual turns and then withdrawn with a rotary motion, forming threads. This nut was turned onto the tapered end of the wire, and being slightly harder than the copper in the wire, cut a satisfactory thread.—Thomas A. Hancock, Los Angeles, Calif.

### Preserving Stove Linings

The fire-brick lining of a stove will last much longer and give better service if promptly jointed with fire clay. When the new fire bricks are placed in the stove, set them with the clay, which is mixed to a mortar with water. Burn a few sticks of wood, taking care not to heat the stove too rapidly, and the clay will soon harden. The lining usually begins to deteriorate at the joints, and by filling them with fire clay, the latter may be removed and a

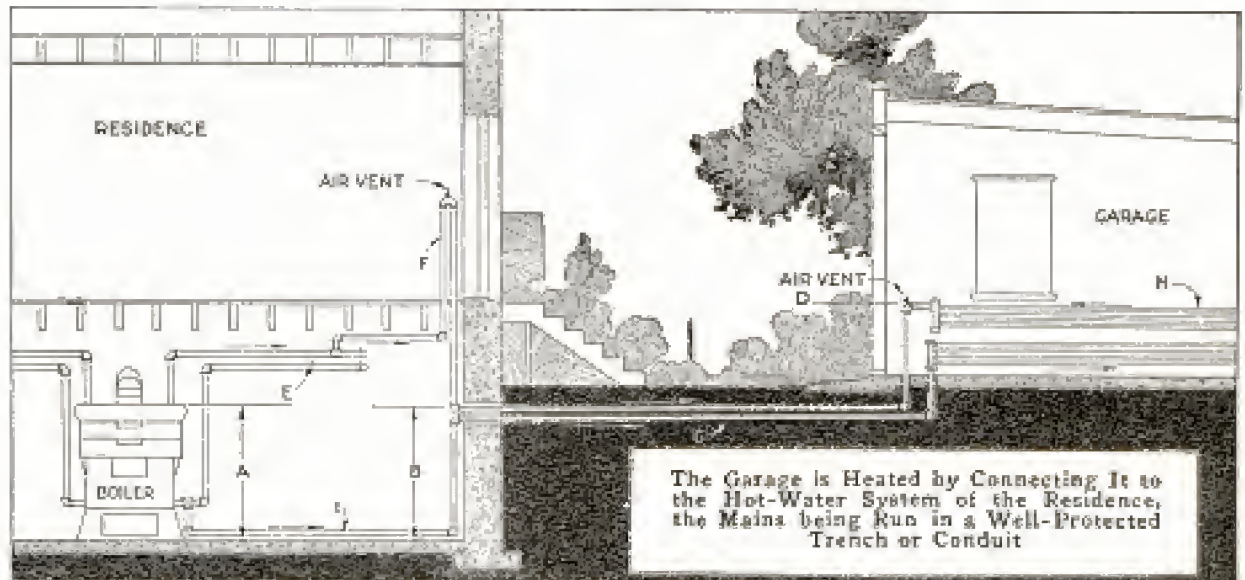


This Torch Produces a Powerful Flame and Is Useful on Heavy Sheet-Metal and Boiler Work

is forced from the end of the coil, which is also shown in detail. It is  $9\frac{5}{8}$  in. long and  $2\frac{1}{8}$  in. diameter. The oil is

new layer inserted when it has pitted or cracked badly.—L. E. Fetter, Portsmouth, N. H.





### Heating a Garage from Residence Hot-Water System

The heating of a home garage in winter is a problem that confronts not a few motorists, and the method suggested in the sketch has been found practicable for utilizing heat from the residence heating system for this purpose. The chief difficulty encountered was that the top of the boiler in the basement was too high to permit the flow pipe to be run underground to the garage. In other instances the boiler may be situated so that a pipe extending across the cellar as required would be much in the way. These difficulties were overcome by the installation shown in the diagram.

The flow main to the garage was connected to a flow main, E, in the cellar leading directly from the boiler at the top. The pipe then passes through the floor, forming the loop F, which is provided with an air vent. From this, the pipe passes down to below the grade of the ground outside and into the tile, or other suitable trench, leading to the garage. The top of the loop F must be at least 3 ft. above the intake at D, and more is desirable if convenient to provide it. The circulation to the garage depends in a large measure on the height to which the loop rises. The distance B must not be more than 18 in. less than the distance A.

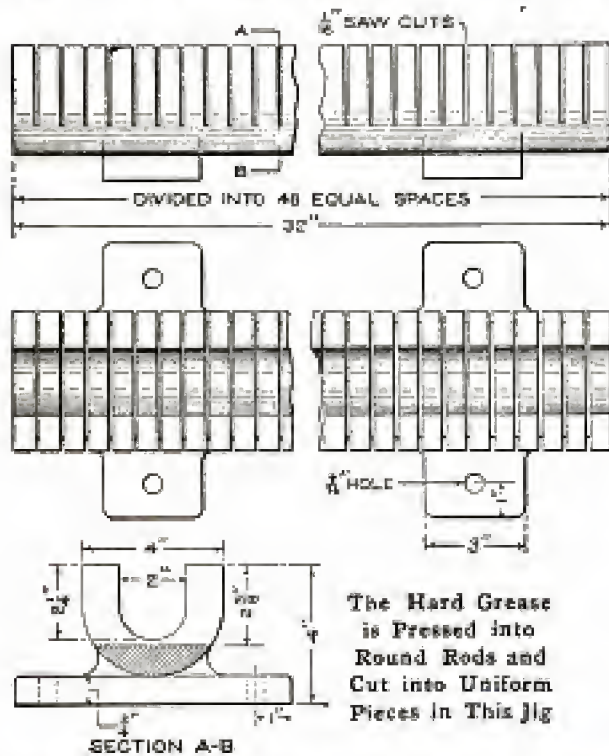
Run the pipe in the trench as close to the surface as it is possible to do and still provide adequate covering and protection. The arrows indicate that the pipes grade up toward the heads of the former. The main connects with the coils in the garage, as shown, flowing into the upper coil, which is in turn connected with the lower one at the extreme end, not shown. The return main G also is laid in the trench and grades up as indicated by the arrow. It passes through the wall and into the cellar below the flow main and then drops to the floor and returns to the boiler. The return pipe I need not be below the center line of the return tapping on the boiler, unless there are doorways, or other obstructions, making it necessary to drop it to the floor as shown. It must not, however, be connected to any other return pipe at a height above the center line of the return tapping. The loop F and the coil H should be freed of air by means of the vents.

### Jig for Cutting Hard Lubricating Grease

In order to cut hard grease into disk-shaped pieces, about  $\frac{1}{2}$  in. thick and  $1\frac{7}{8}$  in. wide, the jig shown in the sketch was devised in a railroad shop. The principle involved may be used for a variety of similar purposes with slight adaptation. The grease is



shipped in barrels and prepared for use by pressing it through a die to form it into long sticks,  $1\frac{7}{8}$  in. in diameter. These are placed in the jig



and cut to uniform lengths, each piece weighing one ounce. The pieces of this size are used for the grease cups of locomotive driving rods. The device consists of a casting of iron provided with legs by which it is bolted down. It is 4 in. high, 8 in. wide, and 32 in. long. The guide slots are cut with a saw, cutting a kerf  $\frac{1}{16}$  in. wide. The inside of the jig is finished to make it easy to clean.—J. K. Long, Renovo, Pa.

### Eliminating Pounding in Gasoline Engines

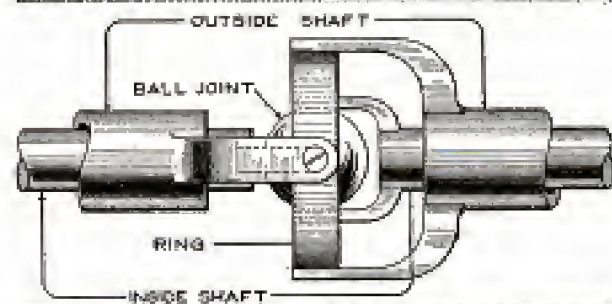
Pounding in a gasoline engine can, in almost every case, be attributed to a loose part within, particularly the various bolts. A careful examination should be made immediately, the bolts and nuts of the connecting-rod bearings, the main-shaft bearings, the bolts that connect the flywheel to the crankshaft end, and other fittings being closely inspected. A loose bolt on a flywheel rotating at great speed, is particularly dangerous, and should be remedied at once.

### Safety Device for Wheelbarrow

When a wheelbarrow is pushed through a narrow passageway the hands of the laborer may be painfully injured by striking against the door jambs. To overcome this, nail a block of wood on each handle of the wheelbarrow just in front of the grip. The block should be tapered from the front end.—Victor E. Carpenter, South Bend, Ind.

### Double-Shaft Universal Joint

The universal joint shown in the sketch provides for the use of one shaft within the other, permitting the two sections to be at an angle to each other while in operation. Other features are that the shafts may be run at different speeds, in the same or opposite directions, or one shaft may be run while the other is stopped. The outer shaft is a tube having a fork at the end adjoining the large ring at the universal joint. The forks are mounted on this ring with screws, as shown. The inner shaft is solid and the forks at the end are mounted on a solid steel ball, in the same relation to each other as are the larger forks, mounted on the ring. While largely an experimental device,



This Universal Joint Houses One Shaft within Another and Has Experimental Interest for Power Transmission

it has interesting possibilities for application to machinery and power transmission.—James O. Tow, Columbia, Missouri.

Electric fans are used for the drying of motion-picture films. The films are wound on large drums which are revolved steadily while the current from the fan is played upon them.



# Garden Seats of Concrete



By EDWARD A. KRUEGER

[This article details the making of two garden seats and gives designs for four others. Information on the various materials, surface finishes, and the mixing of concrete is given in pamphlets furnished gratis by manufacturers of Portland cement.—Editor.]

THE making of cement products is especially practicable for the home worker in that the materials required are inexpensive and easily procured; with reasonable care, excellent results may be obtained, even by a novice. The permanence of concrete, properly mixed and placed, commends it as a constructive material for many objects of use and ornament exposed to the elements.

A garden seat like that shown in Fig. 1, without the paneling on the edges, involves first the making of a plain box form for the top slab. This may be used for the making of two or more supports by nailing partitions in the form, as shown in the sketch and detail drawing, Fig. 2. A smaller form is required for the foundations, which are cast in molds separated by partitions. Make a rectangular form, having inside measurements of  $18\frac{1}{2}$  in. by 8 ft. and  $3\frac{1}{2}$  in. deep, for the top slab. Build up the platform for the form of  $\frac{7}{8}$ -in. flooring, and smooth the top surface to give a good finish to the concrete. Cut the end pieces squarely,  $18\frac{1}{2}$  in. long, and fit them between the sidepieces. Screws, 12-penny common nails, or bolts, as shown in Fig. 2, may be used to hold the form together. Square the form and nail strips across the upper edges to prevent the weight of the concrete from forcing out the sides. Toenail it in place on the platform, clean the interior, removing nails or other obstructions, and smooth off

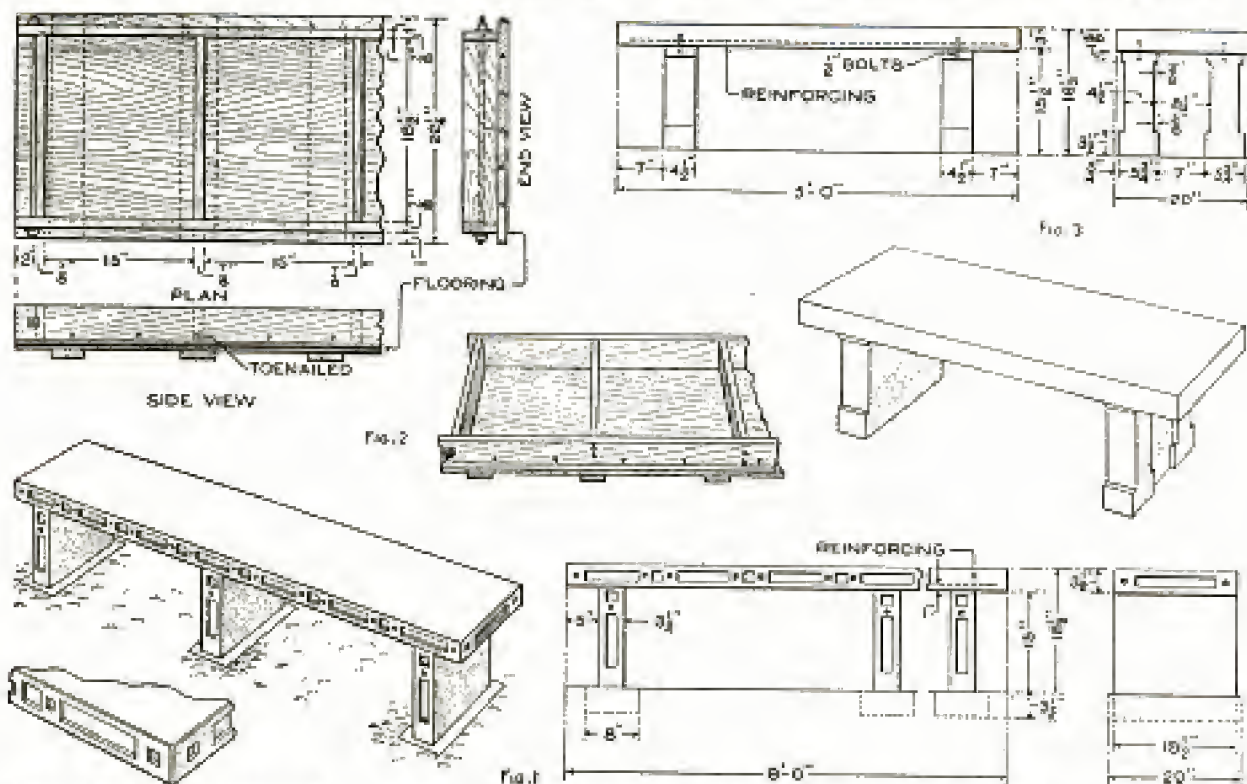
rough parts with sandpaper. Fill any irregularities in the inner surfaces of the form with plaster of Paris, and permit it to dry. Apply one or two coats of shellac to the inside of the form, to protect it from the moisture. When the shellac is thoroughly dried, apply a uniform coat of linseed oil to the mold and the form is ready for the concrete. If many slabs are to be made with a mold, soak the wood thoroughly in crude oil before making the form.

If the form for the supports is made from new stuff, the process of construction is similar to that described. Set the partitions squarely, 15 in. apart from face to face, nailing them as shown. If the form for the top slab is used for the supports, clean it, and apply fresh coats of shellac and oil for each successive use. The weight of the top slab is usually sufficient to hold it in place. If desired, bolts may be cast into the upper edges of the supports and fitted into holes in the top slab, as shown in Fig. 3.

The top slab is reinforced with heavy wire mesh, or with  $\frac{1}{4}$ -in. round iron rods. The latter extend lengthwise of the slab, set on 3-in. centers, and crosswise on 10-in. centers, their ends being  $1\frac{1}{2}$  in. from the adjacent edges of the slab. They should be wired together to form a mat, or wired to light wire mesh. The reinforcing is placed 1 in. from the lower side of the slab, as shown in the working drawings, Fig. 1. It is important, therefore, that the upper side of the slab be marked when the form is removed, as the reinforcing is less effective if the slab is inverted.



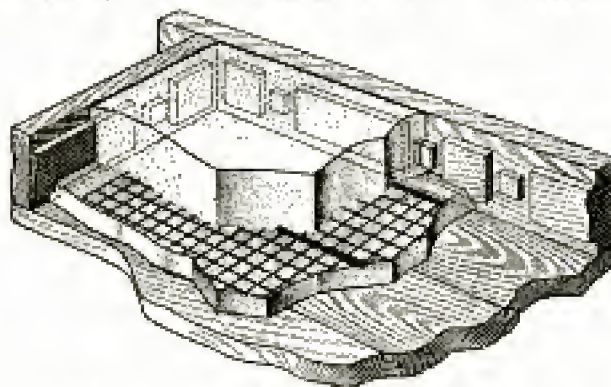
If bolts are used in the supports, set wooden pegs of the proper size at tamping. Fill the mold, tamp the concrete, especially around the edges, and



Plain Slabs of Uniform Width, Paneled if Desired, are Used for the Seat Shown in Fig. 1. That Shown in Fig. 3 Involves the Use of Special Forms for the Shaping and Paneling of the Supports

corresponding points in the bottom of the mold.

Prepare the concrete mixture and pour the mold as follows: Mix thoroughly a batch of concrete just sufficient to fill the mold, using one part of Portland cement to three parts of coarse, clean sand, a 1:3 mixture.



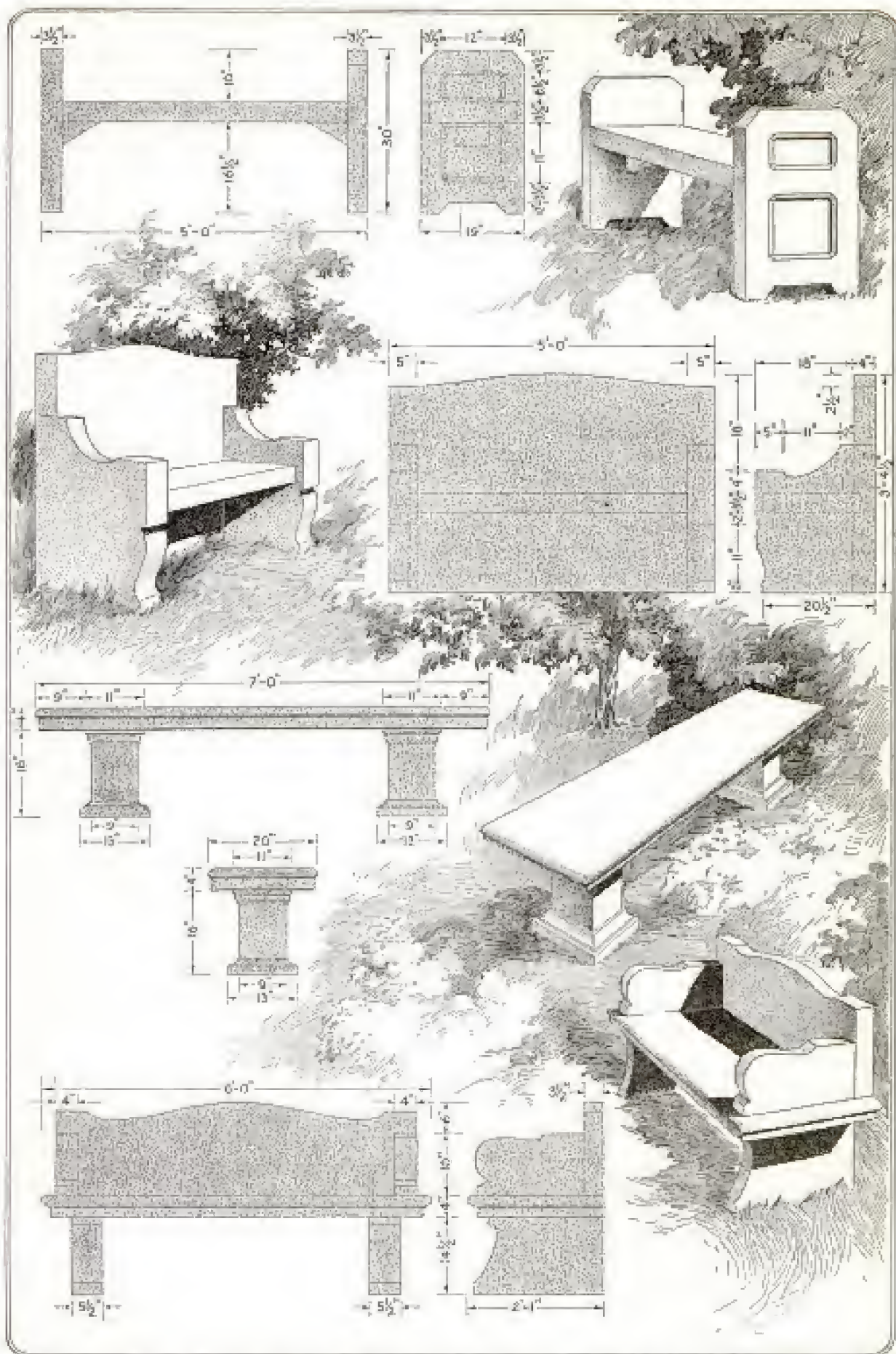
The Method of Making the Edge Panels and of Reinforcing the Top Slab

Fill the mold uniformly to a depth of 1 in. and set the reinforcing into place, as shown in Fig. 4. The concrete should be wet enough so that water will rise to the surface with slight

jar it to force the mixture well into the corners. Level the surface with a straightedge, and finish it carefully with a trowel. The edges may be rounded slightly with an edger or struck off at a slight bevel, using the trowel. The supports are made similarly, but without reinforcing. The edges are left square.

Permit the filled mold to remain at least 48 hours, when the sides of the form may be removed. The slab must not be moved from the platform, on which it was cast, for at least a week. If the edges are chipped or corners broken away, patch them by moistening the broken parts and filling the irregularities with the mixture. The slab should be moistened two or three times a day while "curing," and should not be exposed to heat, to a drying wind, or to the sun. Set the foundations, leveling them with great care, and mount the supports on them, set in a course of cement mortar. Set the top slab into place, upon courses of cement mortar, if no bolts are used.





These Garden Seats and Benches of Simple, Dignified Design may be Made by One of Fair Mechanical Skill at Small Outlay. They Add to the Comfort and Beauty of the Home Grounds, and Are of Substantial Construction, to Withstand the Elements



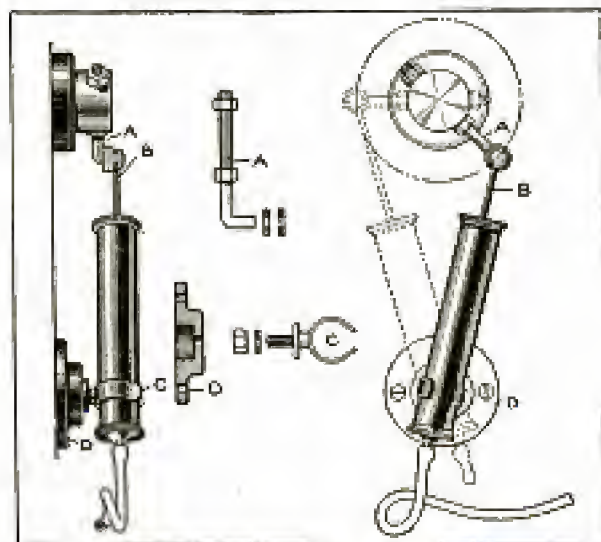




and clean, shellac, and oil it. Set the bolts which join the top slab and the support into the upper end of the form, and the mold is ready to be poured. Fill the mold with a 1:3 mixture of Portland cement and coarse, clean sand, and proceed in general as in the making of the slabs for the first seat.

### Air-Pump Blower Driven by Punch Press

The pump shown in the sketch was devised for blowing away punchings of a light material and for keeping the parts of the dies clear. The pump was fastened to the shaft of the press by means of the shouldered bolt A, fixed in place with two nuts, as shown. The plunger of the pump B was fastened to the shoulder of A, and the body of the pump was inserted in a clip, C, fixed to the side of the press. The clip was made in the form of an oarlock and bolted to a flange, D. The latter was fixed to the punch press with flat-head screws. The rubber hose connected to the lower end of the pump is just long enough to reach the dies. The pump may be removed from the clip easily

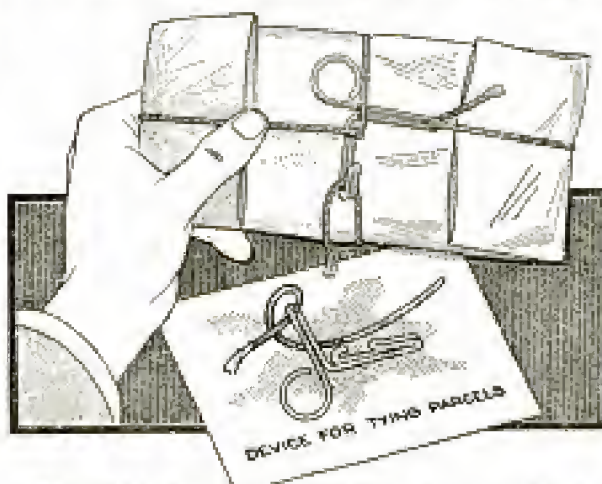


The Pump is Fixed to the Side of the Punch Press so That It is Operated Automatically, and Is Removable by Reason of the Clip C

and released at the shoulder of the bolt A, for use in the ordinary fashion.—George P. Kuhne, East Rutherford, N. J.

### Device for Tying Parcels

The wire clip shown in the illustration was devised for use in tying parcels temporarily, and is especially



The Cord is Fastened to One End of the Device and is Passed Quickly around the Parcel and Locked at the Hook

convenient for bundles of letters and other small objects. It is bent from a piece of wire to the shape shown, and one end of the tying cord is clamped in the folded portion of the wire. Starting from this point of fastening, the cord is passed around the parcel, hooked to a small projection at the center of the device, passed at right angles around the parcel and clamped under the hook as indicated. The round loop is used in grasping the device and steadying it while the cord is drawn rapidly into place. The cord is released quickly by removing it from the hook, and the device, with cords of various lengths, may be prepared and kept on hand for repeated use.—E. E. Burnham, Amite, La.

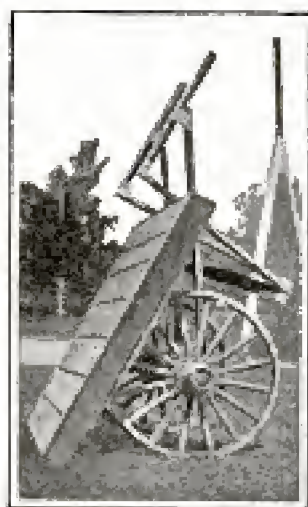
### Remedy for Noisy Telephone Bells

In a large office where each desk has its individual telephone the repeated ringing of the various call bells is annoying. Especially is this true if the telephone bells are highly pitched. To eliminate this feature, a large concern, which owned its telephones, had the bells slotted twice with a hacksaw. A metallic, unobjectionable buzzing sound results when the operator rings a station.



### Garden Dump Cart of Varied Uses

The cart shown in the illustration gives better service than a wheel-



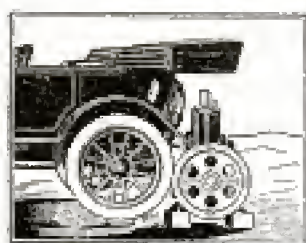
barrow, and was made from materials gathered in the barn and home workshop. The fact that it can be tipped to dump off loads readily, as shown in the illustration, makes it handy for hauling dirt for the garden and tennis court, and the transporting of

sod. On the lawn it carries tools, grass, and water. In the garden and orchard it is used to carry fruit, vegetables, and other products, its width being such as to fit conveniently between the rows.

The cart was made by cutting off the rims and spokes of an old set of buggy wheels, and nailing double barrel hoops on them. These were covered with old bicycle tires, affording a good protection when the cart is used on lawns. A wooden axle was provided and the braced handle fitted to one end at a height convenient for pulling or pushing the cart.—E. R. Smith, Walla Walla, Wash.

### Spinning a Cranky Engine

After overhauling and tightening the bearings of a marine engine, it was



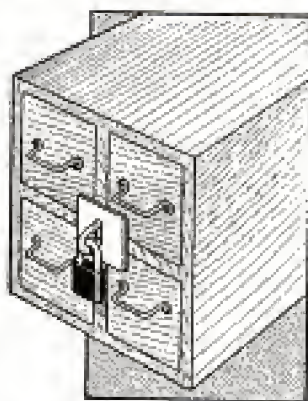
found necessary to crank it by other means than by hand. The only available power was an automobile, one rear wheel of which was jacked

up, the other three blocked, and the motor mounted on skids, placed as shown in the sketch. Its flywheel was set in contact with the tire of the raised

wheel of the automobile. By engaging the clutch gently, the cranky engine was caused to operate, and in a few minutes was running on its own power.

### Locking Four Drawers with Plate Hasp

It is sometimes not practicable to provide separate locks for several

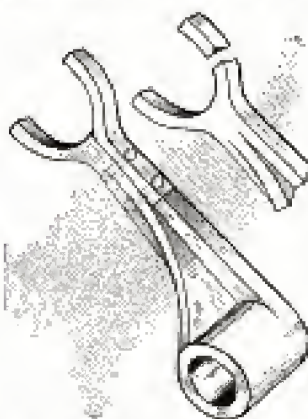


adjacent drawers, and under these circumstances the plate hasp shown in the sketch was used with satisfaction. A staple riveted into a plate was fastened to the strips between the drawers, and

a square plate having a suitable slot cut in it was fitted over the staple. A small lock secured to the staple locks the drawers effectively.—Joseph Prophet, Pittsfield, Mass.

### Shifting-Fork Repair

The shifting fork on an automobile gear box broke at one of the prongs,



and a new one was made to replace it, as shown in the illustration. A piece of strip steel was bent to the same shape as the broken prong, and a portion was cut out of the shank of the fork into

which the strip was fitted. Two  $\frac{3}{16}$ -in. flat-head rivets were used to fix the prong in place. The repaired fork has given satisfactory service under hard usage.

ⒸGraphite and oil will arrest cutting in bronze bearings when oil alone proves ineffective.



### Mitered Corner That does Not Show Wear

In mitering edges subject to constant wear the usual way of having a sharp mitered corner is not satisfactory. In many instances a sharp edge is not desirable, and once it wears, it is unsightly. This is particularly true of tables where strips are mitered onto the edges of the top, either to make it appear heavier or to hide the end grain. The disadvantages of having a sharp miter in such a place results in the common use of a thin strip plain-butted and glued to the edge. This shows the joint and gives the article a cheap appearance.

An effective means of overcoming these difficulties is to make a sharp mitered edge on the main piece, and a rounded mitered edge on the trimming. This affords protection for the end grain and is not easily affected by wear.

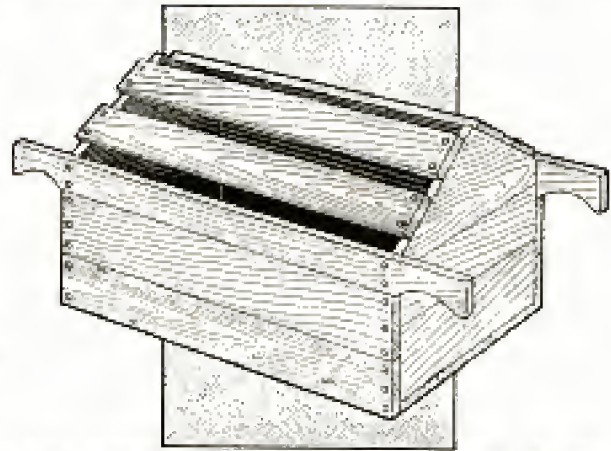
### Bottle Stopper and Filler for Ruling Pens

The ordinary quill fixed to a bottle stopper for use in filling ruling pens is unsatisfactory in that it does not deliver a uniform quantity of ink. A stopper that can be adjusted to the depth of the ink in the bottle is made by inserting the glass from an eye dropper through the cork of the bottle. The glass is adjusted to the depth desired and as much ink as is needed may be released by controlling the air supply with the forefinger, at the upper end of the glass.—Francis W. Nunnemacher, Berkeley, Calif.

### Shipping Case Insures Carrying Batteries or Liquids Upright

The shipping case shown in the sketch was devised for a large storage-battery concern after difficulty had been encountered in shipping batteries without pouring out some of the acid. It is useful also as a crate for shipping bottles of liquid which must be transported in an upright position. The

unusual shape of the case attracts attention and it is not likely that it will be placed in any other than the desired position. The handles are provided for

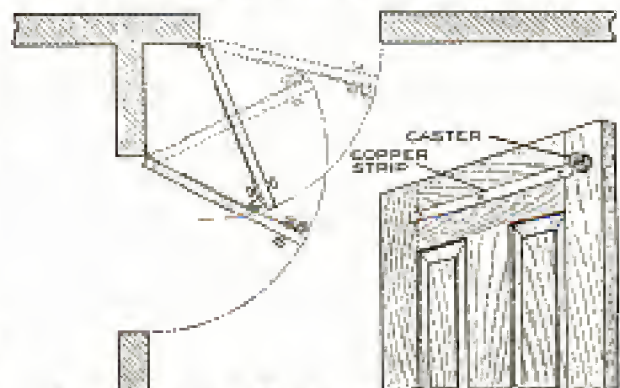


The Peculiar Shape of the Shipping Case Insures That the Contents will be Kept in an Upright Position

convenience in carrying, and the contents may be removed quickly by unfastening the boards at the top.—Joseph P. Bowles, New York City.

### Rollers Prevent Marring of Adjoining Doors

The knobs of adjoining doors frequently cause a marring of the finish and bruising of the woodwork, which may be avoided by the use of the roller device shown in the sketch. A copper strip is placed on each door so that a roller on the other door operates on it. The strips and casters should be placed so that their action will not interfere.



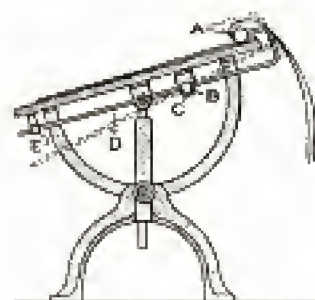
The Action of the Rollers on the Metal Bearing Strips Prevents the Marring of the Doors

If the fittings are selected carefully and installed properly, they will not spoil the appearance of the woodwork.—L. F. Richards, Dorchester, Mass.



### Holder for Examining Drawings

Unnecessary wear on drawings, or blueprints, and considerable inconvenience are often caused in drafting rooms and elsewhere when drawings must be referred to repeatedly, on various parts of a set, or roll. The device



shown in the sketch is a holder that may be fixed to the drafting table, or other convenient place, for examining drawings, and prevents wear as well as makes consultation of the drawings easy. A wooden cylinder, A,  $1\frac{1}{2}$  in. in diameter, and as long as is necessary for the drawings, is supported on two  $\frac{3}{8}$ -in. rods, which are fixed to the bar B. The latter is supported by two brackets C, fastened to the under side of the drawing board. A rod, D, is fixed to the bar B and extends to a convenient point at the front of the drawing board, or table. The hook E holds the rod D in position. To release the drawings, unhook rod D and move it downward, pivoting on B, as shown by the dotted lines. The rod D should be so arranged that when it is in the hook E, the proper pressure to hold the drawings is given to the cylinder A.—H. P. Morgan, South Norwalk, Conn.

### Motor Cylinder Repaired with Copper Strip

One of the cylinders of an automobile was scored badly the full length of the stroke by the loosening of a wrist pin. There was not time to have the cylinder rebored, so an emergency

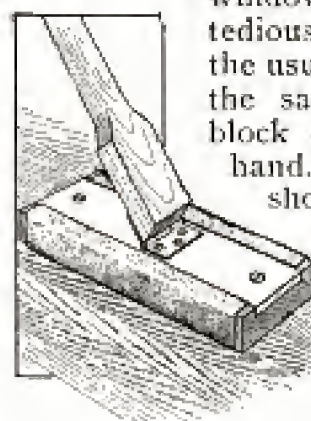


repair was undertaken with success, as follows: The cylinder was dismounted and a channel was cut in the shape of a dovetail, as shown in the sketch, ex-

tending from the end of the cylinder to the other end of the scored portion. The channel was made to the depth of No. 18 gauge sheet metal, and the bottom of it was rounded to conform to the curve of the cylinder. A strip of copper was wedged into the channel, as shown, and riveted into place. The surface was then dressed down to the proper curve and scraped smooth. The strip must be curved slightly, as indicated in the sketch at the right, in order to fit into the channel. Nearly the full power was obtained from the cylinder.—Logan E. Anderson, Cove, Ore.

### Sanding Block for Interior Trim and Floors

Sandpapering, especially on large surfaces, such as floors, or door and window casings, etc., is a tedious task when done in the usual way by gripping the sandpaper around a block of wood with the



hand. The device shown in the sketch provides a convenient method of applying the sandpaper and is especially useful, by reason of the handle, in reaching casings and other woodwork at a considerable height above the floor. The sandpaper is gripped in the block by inserting it under the piece fastened in the top with screws.—Guy E. Waite, Ottawa, Ill.

### Notch in Wick Improves Lamp Flame

A railroad brakeman who had an unusually bright light in his lantern explained that it was due to the care given the wick. He cut a small notch at the center of the edge of the wick, causing the flame to have a notched outline at its top. This gave relatively more light than the flame from a wick cut square across.—C. E. Drayer, Cleveland, Ohio.





## Portable Fence for Baby's Play Area

By L. N. ROBINSON

**A** CHILD in the "toddler" stage should be provided with a safe place in which to play without disturbing the household routine of the busy mother too frequently. The folding wood-and-wire fence shown in the illustration meets this need in a practical and inexpensive manner. It may be used in the home or out of doors, the fence being especially useful in the latter case, since it protects the child,

and likewise the lawn flowers, which a youngster, unguarded, may injure. The fence is 25 to 32 in. high, strong enough to support a grown person sitting on the edge of it, and incloses an area of about 4 by 6 ft. This is ample for the child, and the folded fence is thus not too bulky to be transported easily. The materials cost less than \$3.50, including hardware for the making of the fence, as shown in the working drawings. The wood used for the main

frames is  $\frac{1}{2}$  by 2 in., and they are covered with wire mesh, the edges of which are nailed under strips, on the outer side of the frames. Care should be taken to insure that none of the wire strands is exposed, thus endangering

the child, or the clothes of passers-by. The frames are hinged together, as shown in the plan, and fold into compact form. Two long and four short frames are required. Cut the top and bottom rails of the long frames 6 ft. in length, and those of the shorter frames and the stiles 25 in. The corner joints are cross-lapped by cutting away one-half the thickness of each strip, as shown at A. The joints at the top and

bottom of the center stile, or vertical piece, are made as shown at B, and the joints at the crossing of the center stiles and the cross braces, as at C. The braces only are notched to fit the stile. Each of the joints is fastened with flat-head screws, countersunk. The ends of the braces are cut to fit flush into the corners of the frames, and are nailed in place. This provides a flat nailing surface for the wire mesh and the strips that cover its edges.

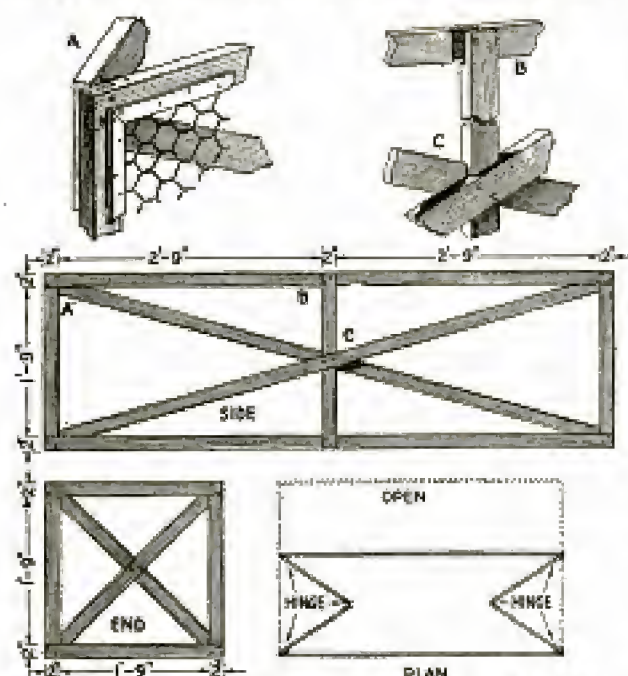
Before putting on the wire mesh, all the exposed corners should be "broken" slightly with sandpaper, the wood wiped smooth, and finished with a coat of shellac. The wood may, of course, be left unfinished. In fixing the 1-in.



A Safe Play Space Either Indoors or Outdoors is Provided for the Child, and the Fence may be Moved Easily. The Construction Is Light yet Stable, and can be Carried Out without Difficulty by the Home Woodworker



wire mesh in place, fasten one end of the piece squarely at the end of the frame, nailing it with staples. Place a strip of wood under each end of the



Join the Pieces with Well-Made Lap Joints, and Hinge the Frames as Indicated

frame and bear down on the middle of the frame, or weight it, to produce a bowed effect. Then nail the other end

of the wire securely; on removing the strips, the wire will be drawn taut. Tack the edges down, and repeat this process on the other frames. Next nail the covering strips on the front faces of the frames, mitering them at the corners, as shown at A.

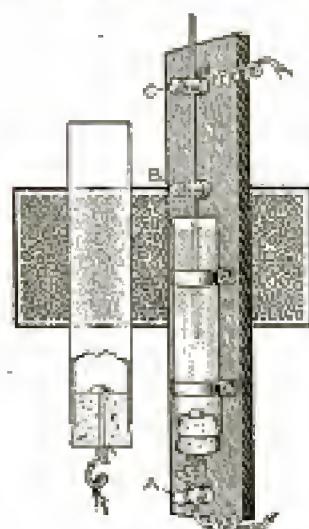
The frames are then joined by means of hinges, as shown in the plan at A. Care should be taken that they are set so that the corners of the fence meet squarely and evenly when it is opened. Metal drawbolts should be fastened horizontally, one on the top of each folding joint between the end sections. These will prevent the child from folding the ends in, and possibly injuring its fingers. The completed fence is then given a final coat of shellac or varnish, the galvanized wire being left unfinished.

The materials required for the fence are as follows, the wood being listed in lineal feet, and smoothed on four sides to the dimensions indicated:

- 155 ft.  $\frac{1}{2}$  by 2-in. clear pine.
- 50 ft.  $\frac{3}{4}$  by 1-in. clear pine.
- 22 lineal ft. 1-in. mesh, 2-ft. wide wire fencing.
- 6 pairs 1 $\frac{1}{2}$ -in. iron plain butt hinges, with screws.
- 2 steel drawbolts, with screws.
- $\frac{1}{2}$  pt. white shellac.

### Water Rheostat for Small Electrical Devices

The rheostat shown in the illustration can be made quickly and at small expense. The



base consists of a piece of wood,  $\frac{1}{2}$  by 2 by 12 in. A glass tube, 1 in. in diameter and 6 in. long, is fastened to this with strips of sheet metal. A large brass tack is driven into a cork, and the cork is inserted in the lower end of the tube. A

wire runs from the brass tack to the binding post A. The lower part of the tube should be

paraffined to make it water-tight. A brass or copper rod is placed through the binding posts B and C. The resistance can be changed by sliding the rod up or down. The tube is nearly filled with water having a small quantity of salt dissolved in it. The amount will depend upon the current to be reduced. The rheostat should be fastened to a wall, or other support, and may be used to regulate the speed of small motors and other electrical devices.—R. R. Wayt, Pittsburgh, Pa.

### White Blotting Paper Improves Light Reflectors

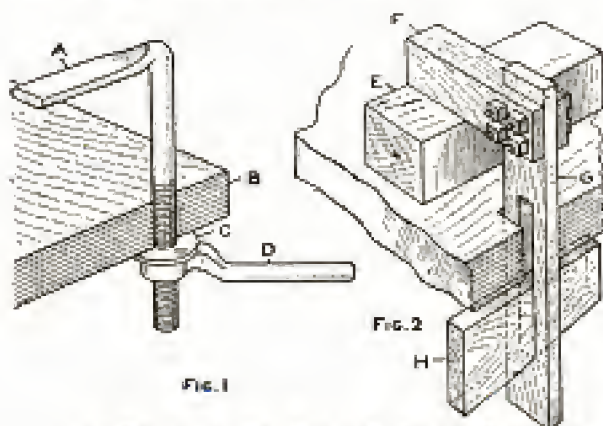
In the lecture and classrooms of a large university it was found that reflections of the electric-light bulbs in the glazed porcelain reflectors were extremely annoying to the eyes of students, and concentration of sight on the blackboard was difficult. A num-



ber of tests were made, and the following method proved successful, eliminating the glare and the reflections. Large sheets of white blotting paper were cut to fit the inside of the reflectors, and then glued to their surface. The soft, somewhat rough surface of the blotting paper diffused the light, so that the glare was overcome.  
—C. M. Hall, St. Louis, Mo.

### Two Simple Vises for the Home Workbench

Boys, and other amateurs, sometimes have need of a vise when a commercial article or one of standard type cannot be had readily. The devices shown in the illustration will give good service and can be made of material easily obtained. The vise shown in Fig. 1 was made of old machine parts, consisting of a bolt and a wing nut. The bolt A was flattened at one end and bent at a right angle. A hole to fit it was bored through the top of the bench B, and the washer C and wing nut D were put in place. The piece to be gripped is clamped under the end A. This device should be fitted near the end and front edge of the bench.

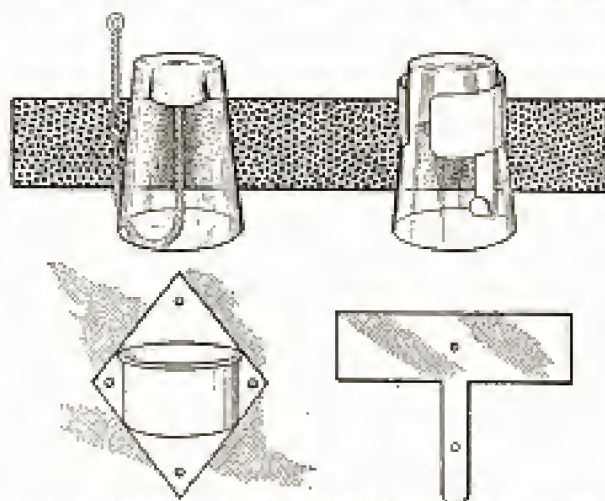


These Vises may be Made Easily of Materials Available in Most Workshops

The vise shown in Fig. 2 grips the block E in the same manner as the first vise. The jaw F is bolted to a vertical piece, G, which is fitted into a mortise cut through the bench top. The wedge H passes through a mortise in the piece G and clamps against the lower side of the bench top.—James E. Noble, Toronto, Can.

### Drinking-Glass Holders Easily Made

Several styles of holders for a drinking glass are suggested in the illustration. They may be made of durable



These Homemade Holders for Glasses Are Useful and Quickly Constructed

materials easily obtained in the home workshop. The first is made by twisting a galvanized-iron or brass wire, as shown, with an eye and a loop for fastening it to the wall. A cork is fixed to the upper end, on which to rest the glass. The lower sketch shows a holder of the cup type made by riveting a metal cup to a diamond-shaped plate, the latter being fastened to the wall. The holder at the right is made from a piece of sheet metal cut to the shape indicated below. It is bent to the shape shown, and the lower end of the narrow strip is curved upward to provide a rest for the edge of the glass. The upper portion of the holder should be large enough so that the glass may be raised sufficiently to fit into the rest. The holes are provided for a fastening.—Frank L. Matter, Portland, Ore.

### Emery Needle Cushion on Sewing Machine

A convenient emery pad and needle cushion may be made by inclosing the powder in a long sack, about 1 in. in diameter, and sewing it in place around the arm of the machine. It will thus be close at hand and needles and pins may be stuck in the cushion, free from rust, and will not be in the way.



# A Compensated Aerial Cableway



by Edward R. Smith

THE possibilities for practical use as well as novelty for play and experimental purposes make the compensated aerial cableway, shown in the illustrations, not only interesting but also worthy of study. The arrangement assembled in its simplest form with two towers, in the page plate, shows how the weight of the car is compensated, so that a fairly level course on the track cable is provided. The various positions of the load and cables, showing the application of the compensating principle, are indicated in Figs. 1 to 5, and a multiple system is shown in Fig. 6. The details of the constructional parts are also shown. The car may be driven by wind power, as shown in Fig. 7, or by a motor, as in Fig. 8, in addition to the simple application of hand power suggested in the page plate. Devices for automatically reversing the course of the cars both for the sail rigging and with the use of electrical power, are shown in Figs. 7 and 8. By their use it is unnecessary to have an operator at each end of the cableway. The constructional features were worked out first by experiments on models in a shop, and then applied to a large rigging spanning over 100 ft. between the A-frames. The sketch in the page plate was made from photographs of this construction. Application of the compensating principle to carrying and transportation problems affords opportunity for interesting engineering, in spanning streams, cañons, or gulleys.

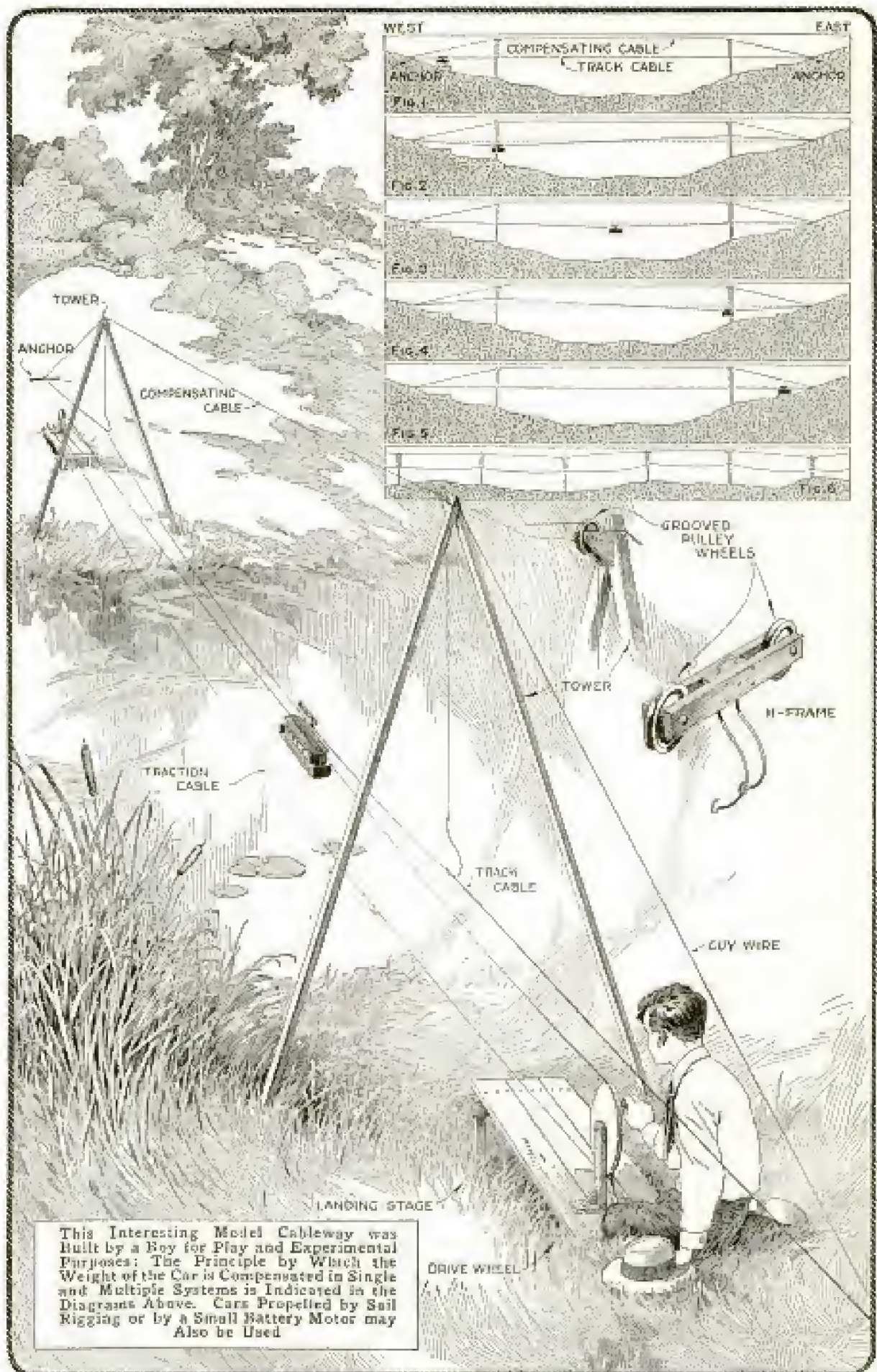
In most types of cableways a considerable sag is allowed in the cable supporting the car in addition to that caused by its own weight. Even in systems of practically constant cable tension, in which the wire is stretched by enormous weights, the loaded car causes a sag in the track cable, and ascends and descends an incline when approaching and leaving a tower. The aim in the compensated cableway is to overcome this sag as much as pos-

sible, and to offer a minimum of resistance to the car in its course.

The simple form of compensated cableway shown in the page plate is made by setting up two A-frames, with wire braces supporting them, and mounting the track and traction cables upon them. A light, flexible compensating cable extends from one tower to the other and is fitted to grooved pulley wheels at the tops of the towers, as shown in the detail at the right. The ends of the cable are fixed to wire hooks, from which the track cable is suspended. The latter is anchored at the ends of the wire braces supporting the A-frames. In order to understand the operation of the system it is desirable that the course of a load be traced in its various stages, as indicated in the diagrams, Figs. 1 to 5. For diagrammatic purposes the load is shown passing from the west slope to the east. As the load passes under the first A-frame, as in Fig. 2, the track cable is drawn down at that point; the corresponding end of the compensating cable is also drawn down, raising the opposite end of the track cable, and taking out most of the sag in the center portion of the track cable. As the load passes to the center position, as shown in Fig. 3, the track cable resumes a more nearly horizontal position. When the second A-frame is reached the load draws the corresponding end of the compensating cable down with the track cable, Fig. 4, and the latter assumes its normal position as the load reaches the end of the course. It is evident from the diagrams that the course of the load is more nearly level than it would be if the sagging of the track cable were not counteracted.

For use with a multiple-frame system, the cables are arranged in units between supports, as shown in Fig. 6. The compensating action is similar, the tendency being to level the entire course of the load. The weight of the



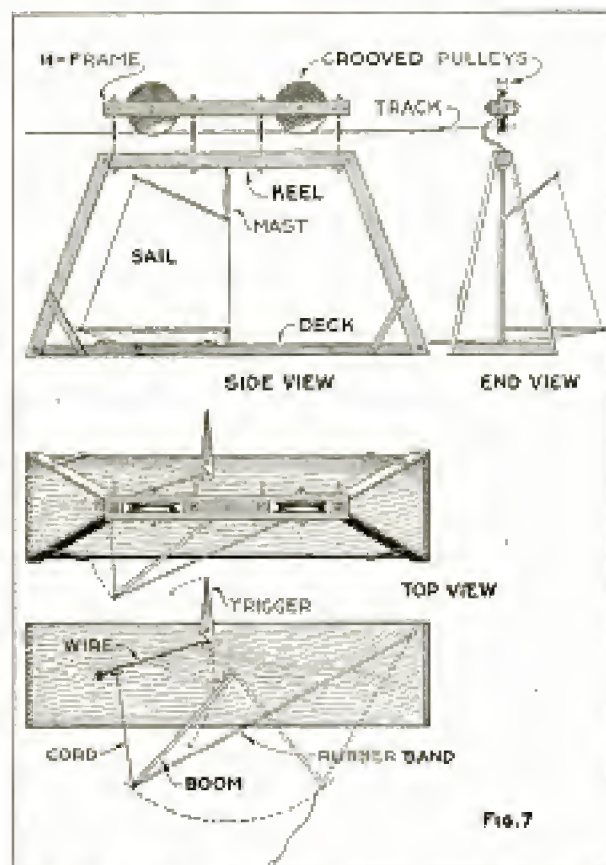


This Interesting Model Cableway was built by a Boy for Play and Experimental Purposes: The Principle by Which the Weight of the Car is Compensated in Single and Multiple Systems is Indicated in the Diagrams Above. Cars Propelled by Sail Rigging or by a Small Battery Motor may Also be Used



car and load only is compensated, and since the weight of the cable will cause a sag, the course cannot be level, but may approach this condition.

A model of the compensated cable-



The Car is Propelled by the Wind Acting on a Sail Controlled Like the Main Sheet of a Sailboat in Tacking. The Trigger Device Releases the Sail, Reversing the Course of the Car

way, as shown in the page plate, or on a smaller scale, may be made by a boy of fair mechanical skill. For experimental purposes the detail may, of course, be refined to a high grade of workmanship, if desired. The size and dimensions of the parts need not be proportioned precisely as shown, but may depend more or less upon the materials available. The track cable should be made of galvanized-iron wire, the compensating cable of fish-line, and the towers of 1-in. stuff, the width of the pieces making up the A-frames being increased in proportion to the height. Grooved pulley wheels, set in housings fixed to the top of the A-frames, carry the compensating cable. These may be made of wood, built up in three sections, to provide a flange on each side of the cable groove. The

A-frames should be joined strongly at the top, and braced to anchors, sunk into the ground as shown. The hooks from which the track cable is suspended are made of heavy wire, bent so as not to interfere with the H-frame hanger supporting the car, and looped around the cable.

Various types of hangers may be devised to house the two pulley wheels which ride on the track cable. A simple H-frame hanger is shown in the detail sketch in the page plate. The grooved pulley wheels are set on bolts, and a heavy wire is bent and set through the center block as a support for the car. For experimental purposes, or even for play, when it is not desired to make a more elaborate car, a wooden block or other object of sufficient weight may be used as a load. An interesting feature of the work, especially for a boy, is to devise a realistic coach model, as suggested in the sketch. A wooden block forms the base, and the roof and platforms are made of sheet metal. The windows and doors are painted on the metal. The inventive boy may, of course, build a car with a hollow metal or wooden body, and weight it properly to provide the necessary load.

The motive power is provided by means of a cord, or traction cable, carried around two large grooved pulleys, mounted in supports fixed to the landing stages at each end of the cableway. They are made of wood, a suitable groove being cut around the edge with a saw, and smoothed with a small round file, or sandpaper wrapped over a round rod. The traction pulley is turned by means of a crank, set on the bolt which is used as an axle. The traction cable must be drawn sufficiently taut to provide the necessary pressure on the grooved pulleys, or it will slip. Rosin applied to the pulleys and the cable will tend to prevent this.

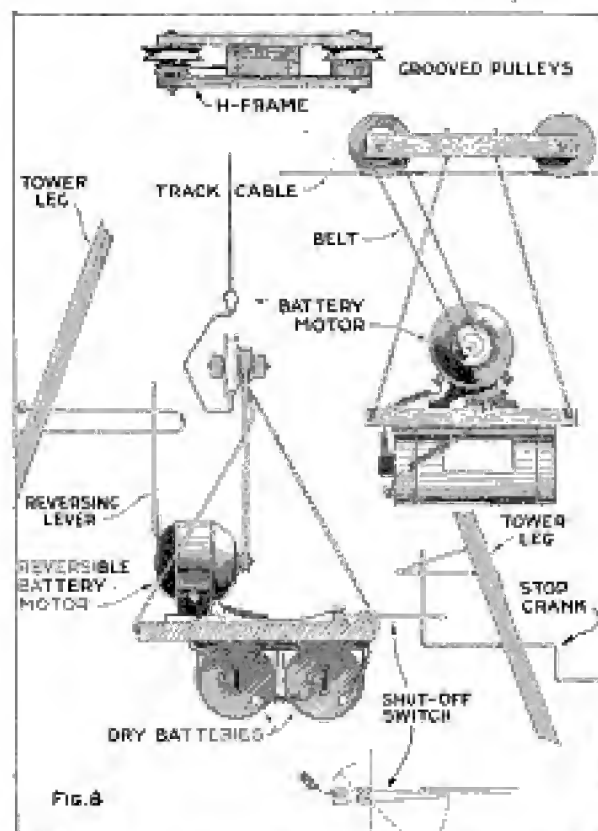
If the frames and other fittings have been properly set up, the cableway will support a sail car, shown in Fig. 7, or a two-cell electric car, driven by a small motor, as shown in Fig. 8. The sailing-car arrangement is often fea-



sible, since a stiff breeze is common in gorges, cañons, narrow valleys, or even in ravines where such a cableway might be set up. The hanger is an H-frame having the grooved pulleys bolted in it, and further reinforced by small blocks at the ends. A braced frame, supporting a deck on which a mast is set, is suspended from the hanger by four curved wires, as shown in the side view, Fig. 7. A sail with boom and gaff is supported by the mast. It is arranged to be shifted around the mast, which is accomplished automatically at the end of a run, or "tack," by means of the trigger device shown in the top view. The sail is controlled in relation to the wind much as is the main sheet of a sailboat. The car can be operated in this manner only at right angles to the direction of the wind, or nearly so. For play purposes, a boy stationed at each end of the cableway can shift the sail, but the trigger device shown makes this unnecessary. A rubber band is attached to the boom, as indicated in the top view, and a cord and wire are arranged to engage a trigger. A stop for the trigger is fixed to the A-frame so that it is sprung when the car reaches the end of the run. The rubber band reverses the sail, the car having been set on the cable originally so that the forward end is in proper relation to the wind.

The electric car is especially interesting in that it provides self-contained motive power by means of a battery of dry cells, and a motor belted to the hanger, as shown in Fig. 8. The hanger is of the H-frame type with heavy blocks between the sidepieces to provide for the small grooved driving pulley set on the axle of one of the larger pulleys. A wooden deck, supported by four heavy wires set into the center block of the hanger, carries the motor, and the dry cells are fixed under it. The motor is of the small reversible battery type, and should be provided with a reversing lever. This will make it possible to reverse the car when it reaches the end of its course. The motor and cells should be disposed

so as to balance, tests being made for this purpose before setting them in place finally. A cord or small leather belt connects the drive pulley of the motor with the proper pulley on the



The Electric Car Is Self-Contained and may be Reversed Automatically, if the Motor Is of the Reversible Type, by Contact of the Lever with the Stop Fixed to the A-Frame

hanger. These pulleys should be in line, and that on the hanger should be five times the diameter of the one on the motor shaft. The power is shut off at the end of the course by a shut-off switch which strikes a stop crank attached to the A-frame. When the reversing lever and stop are used, the stop crank is unnecessary. A non-reversing motor can be made to drive the car in a reverse direction by removing the belt from the motor pulley and replacing it to make a figure-eight twist.

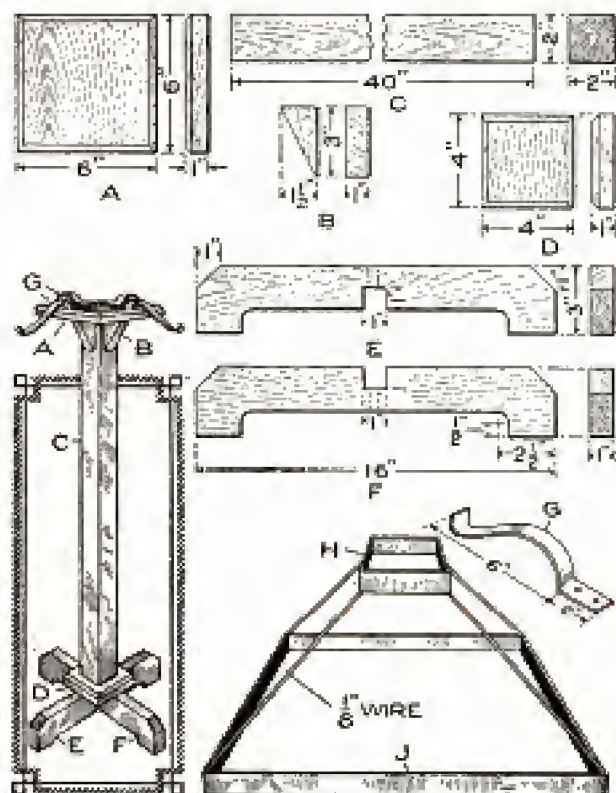
¶When babbitt metal is heated some of the tin and antimony in it is burned out, making it unsuited for use in machinery bearings, and similar purposes, after several heatings. The oxidation of the metal is indicated by the formation of a scum on the surface.



## A Piano or Reading Lamp

By WILLIAM E. FINKERNAGEL

THE lamp illustrated was designed for use in reading, the doing of hand work at which one is seated in a chair away from a table lamp, or for lighting a piano rack. It is light, readily moved about, easily made, and



This Lamp of Substantial Construction and Pleasing Design may be Made at Small Cost. The Pedestal Assembled is Shown at the Left and the Details of the Parts and of the Metal Frame for the Shade, Above

of pleasing design. It combines construction in wood and metal, is inexpensive, and within the range of a careful amateur craftsman. The pedestal is shown assembled at the left, and above are detailed sketches of the parts. The construction of the shade, which is 18 in. square, is shown at the right. The central post is 40 in. long and 2 in. square, and the base measures 16 in. on the arms.

The stock bill for the lamp is as follows:

- 1 piece, 2 by 2 in., oak, for post.
- 2 pieces, 1 by 3 by 16 in., oak, for base.
- 1 piece, 1 by 6 by 6 in., oak, for cap.
- 1 piece, 1 by 4 by 4 in., oak, for column base.
- 1 piece, 1 by 2 by 3 in., oak, for braces.
- Copper or brass strip, 1 in. wide and 3/32 in. thick, for shade frame. Wire braces for shade.

Make all the pieces, smoothing and finishing their surfaces with a scraper, before assembling the parts. The cap A may be made first. Square the piece to 6 in. and cut a 1/4-in. chamfer around the upper edge. Cut the 2 by 3-in. block on one of its diagonals and smooth it to form the braces B. Square the ends of the post C to a length of 40 in., and smooth up the sides. Square the column base D to 4 in. and cut a 3/16-in. chamfer around its upper side.

Square up and smooth the cross arms E and F, for the base, to a width of 3 in. and a length of 16 in. Bevel the upper corners 1 in., at an angle of 45°. Bore holes with a 1/2-in. bit to form the rounded ends of the portions cut out from the lower sides of the cross braces. Chisel the wood away between the holes and smooth the resulting surfaces. The half-lap joint, by which the cross braces are joined, may then be made. It should not be made until the lower portions are cut out of the cross braces, and the remaining portions are made of exactly the same width, 2 1/2 in., according to the drawing. The joint must be fitted tightly in what is termed a driving fit, or it will not be strong enough.

The construction may be assembled as follows, although several methods may be adopted that will prove satisfactory: Fix the cap A to the top of the post with glue and 1/2-in. dowels, bored not quite through the cap. Screws may be used for this purpose, but they mar the finish of the upper surface of the cap. Glue the braces B into the corners to support the cap. They should be warmed before applying the glue and rubbed slightly to bring them into place tightly and to distribute the glue evenly. Small brads may be used to nail them in place, but care must be taken not to mar the finish.

The column base D may be fixed to the bottom of the post in the same way that the cap was fixed at the upper end. The cross braces E and F, form-



ing the base, should be glued in the half-lap joint and fixed to the column base with glue and dowels, or screws sunk into sockets from the lower side of the braces.

When the glue has dried, the pedestal should be scraped and cleaned preparatory to a final sandpapering before applying the stain and varnish.

The arms G for the shade holder are made of strips of brass or copper, 1 in. wide and  $8\frac{3}{4}$  in. long, bent to the proper form, as shown in the sketch. The straight end, 2 in. long, is provided with two holes through which screws are fixed into the top of the cap.

The shade is constructed as follows: Make a 4-in. square, H, of brass strip, 1 in. wide, and solder or rivet it at the joint. Make the lower square J of the same material and in the same way, 18 in. on each side. Solder  $\frac{1}{8}$ -in. wire, of a length that will give the desired slant to the shade, at the corners of the squares, forming a rigid frame for the covering. Cloth or silk may be used to cover the frame.

The braces for the shade may then be fastened to the top of the cap, as shown in the assembly sketch, and their ends shaped to hold the frame firmly. The pedestal should be smoothed off immediately preparatory to finishing, and the sharp edges removed slightly. Care should be taken in sandpapering, since rubbing across the grain is ruinous, as is too much sandpapering. The latter particularly smacks of the novice. A coat of stain, one of filler rubbed in thoroughly, a coat of shellac, and a finish coat of wax or varnish will give a satisfactory finish. The shellac and varnish coats should be permitted to dry thoroughly and should then be sandpapered lightly before applying other coats.

The electrical connections for the lamp may be made from a cord extension to a socket fixed in the center of the cap. In some instances it may be desirable to connect the cord from a floor socket. In that case the post should be built up of two pieces of 1-in. thickness, and a groove to admit the cord made in the center of it.

### Sewing Rack Attached to Rocker

A rack like that shown in the illustration is convenient as a support for articles being sewed or repaired by the

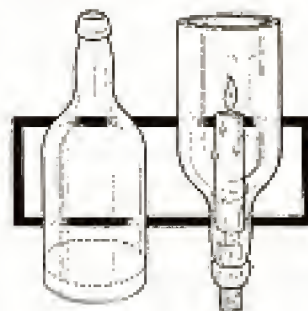


The Swinging Rack Folds under the Arm of the Chair When Not in Use

home worker. It was made by fastening two bars from a towel rack to the arm of the rocker by means of a bolt. When not in use, the bars are folded back under the arm of the chair. One of the bars may be provided with hooks so that scissors and other sewing requisites may be placed on them.—Mrs. J. E. McCoy, Philadelphia, Pa.

### Glass Bottle as a Candle Lamp

A candle may be carried in a glass bottle, as shown in the sketch, with little danger of setting fire to surrounding objects, and without permitting the melted wax to leak upon the floor. The bottom of the bottle is cut off and the candle inserted as shown, the neck affording a convenient handle.—Stanley Radcliffe, Laurel, Md.



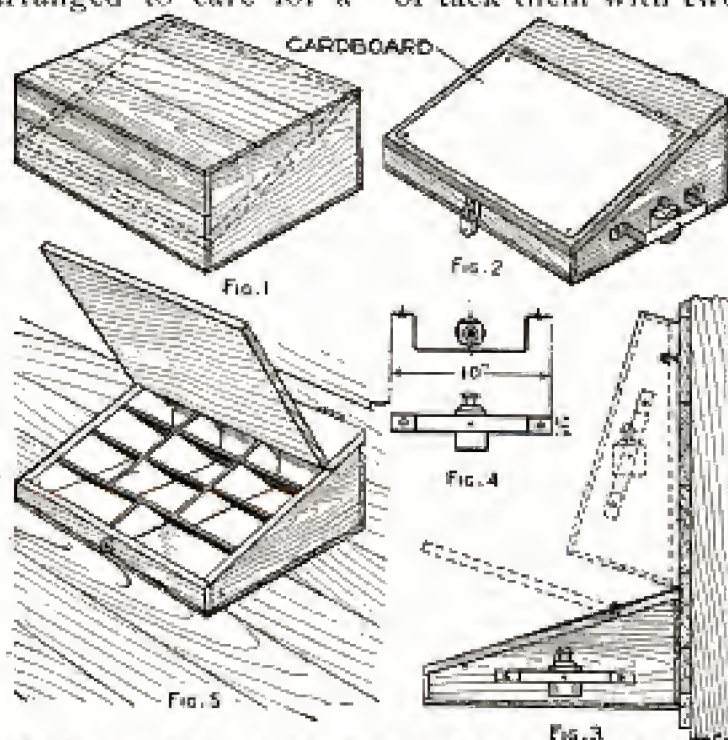


## A Folding Wall Desk

To provide an inexpensive desk in a shop, where space was quite limited, the folding wall desk shown in the sketch was devised. It was cut from a packing box and the hinged lid built up of boards of better quality. To give a good writing surface, a piece of heavy cardboard was fastened to the writing bed with thumb tacks and may be renewed whenever necessary. The inside of the desk was fitted with filing compartments arranged to care for a

parts. The wood should be planed smooth and may be sandpapered lightly when the construction is completed, before applying a finish. A simple arrangement of the pieces so they can be nailed together is that shown in the sketch, which was used in making the box. First shape the pieces for the sides,  $5\frac{1}{4}$  in. wide at the larger end,  $2\frac{1}{4}$  in. wide at the smaller, and  $16\frac{1}{4}$  in. long. Clamp the boards together, or tack them with two wire nails while

shaping them, so that they will be exactly alike. Make a piece  $5\frac{1}{2}$  in. wide and 30 in. long for the back, and one the same length and  $2\frac{1}{2}$  in. wide for the front. Nail them to the ends, as shown, permitting the slight excess material to project over the upper edges of the sidepieces. Trim off this extra stock with a plane



The Packing Box, from Which the Desk was Made, is Shown in Fig. 1. The Dotted Lines Indicate Where It was Cut to Give the Slanting Writing Surface. The Device in Its Normal Position is Shown in Fig. 2; Hooked against the Wall, in Fig. 3, and with the Lid Raised, Showing the Compartments, in Fig. 5.

When not in use the desk may be tilted upward and locked against the wall with small catches. By using a T-square against the left edge of the writing bed, a convenient drafting table for shop sketching is provided.

The detailed construction, for the making of the desk from stock lumber, by boys, or amateur workers with tools, may be carried out as follows: Determine upon the size of the proposed desk. Convenient dimensions are 30 in. long, 18 in. wide, 7 in. high at the back, and 4 in. high at the front. Use  $\frac{7}{8}$ -in. soft wood; pine and poplar are suitable. Cut and shape all the pieces before beginning the assembling of the

so that the upper surfaces of the front and back conform to the slant of the sidepieces. Make a strip 4 in. wide for the upper edge of the desk, to which the writing bed is hinged. Cut pieces for the bottom and nail them in place.

Before nailing down the upper hinge strip the interior fittings should be made. Use wood not thicker than  $\frac{1}{2}$  in., and fit the pieces into place carefully, nailing them firmly through the outer faces of the desk. A better method is to make the pigeonholes or compartments with a piece of the thin stock on the ends of the partitions, so that the compartments are built up as



a unit and slid into the desk, no nails being necessary to hold them.

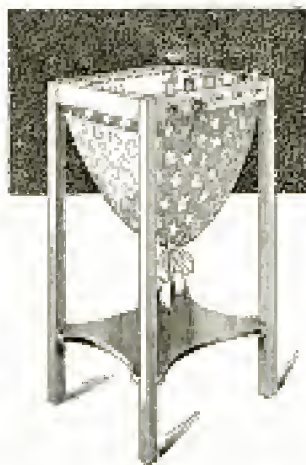
The lid should be made of sound, dry stock and glued up of strips about 3 in. wide, to prevent it from warping or twisting easily. If the person making the desk has the necessary skill, it is best to fix a strip, 2 in. wide, at each end of the writing bed, to hold the pieces together and to keep the bed in shape.

The holder for the inkwell is made of a 1-in. strip of metal, bent to the shape shown in Fig. 4, and drilled to fit small screws. A can is supported in the holder and the bottle rests in it.

The desk may be finished by painting it or giving it a coat of shellac and one of varnish, either after it has been stained to match adjoining woodwork, or in the natural color.

### Sewing Stand with Workbag in Top

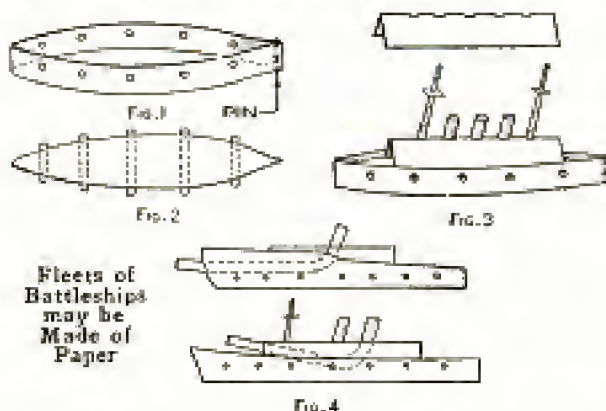
The stand shown in the sketch may be made by using part of a small table, or by building the framework especially for the purpose. It was made for use in connection with sewing and fancy work, and provides for the tools and incidental materials necessary. The stand is 28 in. high and about 15 in. square at the top. The bag built into the frame may be made of any strong, suitable material, and its color should match the finish of the wooden part. A row of nails are set in the top edge of the rails to provide for spools of thread and thimbles. Scissors and other tools are placed on the shoulder hooks fastened on the side of the rail.



When paper sticks to a negative during printing remove it by soaking it in the hypo bath, sacrificing the print rather than the negative.

### Toy Paper Warships

With a pair of scissors, pins, and a newspaper or two, a fleet of warships can be made to sail the seven seas of



polished floors. Strips of paper, through which holes at opposite points have been cut, and pinned together at one end, as shown in Fig. 1, are used for the sides of the boat. Rolls of paper are slipped through the opposite holes, as shown at Fig. 2, and provide support for the deck, which is a flat piece of paper pointed at the end to fit between the sides of the craft. A second deck fitted with funnels and masts, as shown in Fig. 3, is made of a folded piece of paper with holes cut through it for the masts and funnels, which are rolls of paper. If plain paper is used, the warships may be made in several colors, which adds to the effect of rivalry between the fleets. Other types of craft may easily be devised, two of which are shown in Fig. 4. Not only the youngsters in the household, but their elders as well, may find not a little amusement and diversion in the making of a fleet of such warships, modeled after battleships, destroyers, battle cruisers, and other vessels.

### Caster Board for Scrubbing and Floorwork

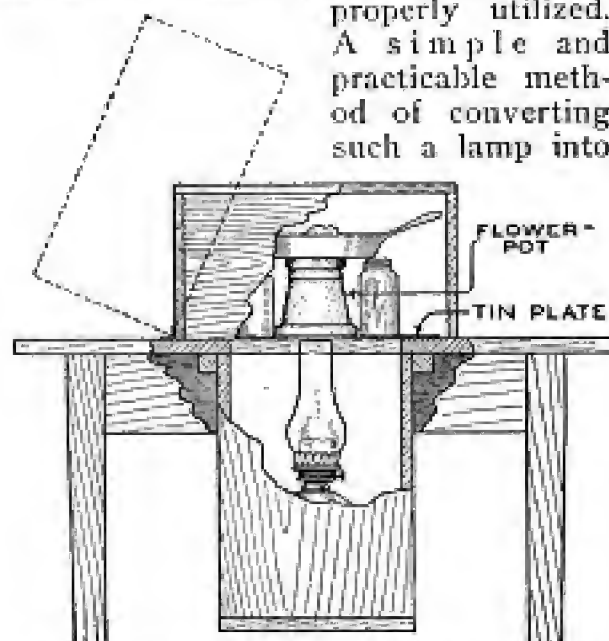
A board for use in work that requires tedious kneeling, as in scrubbing, repairing of sidewalk lights, and similar work, may be made as follows: Procure a board,  $\frac{7}{8}$  by 10 by 14 in., and pad it with a section of carpet. Place three casters under it, two being



set at the rear and one at the front edge. If desired, small strips may be nailed at the sides to prevent the knees from slipping off. Such a device enables the user to move along the floor easily without injuring the knees.—R. S. Matzen, Fort Collins, Colo.

### A Lamp Cooker

An ordinary circular-wick kerosene lamp produces enough heat to do considerable cooking, provided the heat is properly utilized. A simple and practicable method of converting such a lamp into



This Lamp Cooker will Prepare Meats and Vegetables Satisfactorily, and Is Useful for the Camper and in Emergencies

a cooker is as follows: Saw a hole, 12 in. square, in the top of a small table, or packing box of about the same height as a table. Cover this with a piece of sheet metal, having a 4-in. hole in the center. Place a 5-in. flower-pot over the hole in the metal, and plug up the hole in the bottom of the pot with fire clay or plaster of Paris. Vegetables in jars may be set around the flowerpot to cook slowly and a roast in a pan on top of it. A wooden box, or metal pail, large enough to cover the arrangement, should be placed over it. Air holes should be provided in the lower box and in the cover.

To operate the device light the lamp and when it is burning brightly, place it under the table, elevating it so that the top of the chimney is in the center

and barely within the rim of the flower-pot. Use little water in the vegetables and keep the caps loosely on the jars. The roast, if well buttered, will brown nicely, and while the cooking will require considerably more time than it would in a range, the results will be as good, if not superior. The natural juices are preserved by the slow cooking at comparatively low temperature. The cover may be lifted to turn the meat occasionally. This device will appeal to campers, summer cottagers, and others.—W. W. Baldwin, New York, N. Y.

### Placing a Miter Box on the Workbench

In placing a miter box on a workbench considerable space is often wasted, and the workman is obstructed. By raising the miter box on the bench, mounting it upon two blocks, about 6 in. high and set back about 18 in. from the front of the bench, small space is utilized, and the tool may be used as conveniently as otherwise. The space under the miter box and the open space in front of it are available for the disposal of ordinary tools, and there is no danger of the saw striking them. By making another stand, the height of the bearing surface of the miter box, and moving this about on the bench, long pieces may be handled with ease. This stand is removed from the bench when not in use.—Henry Simon, Laguna Beach, Calif.

### A Book and Document Protector

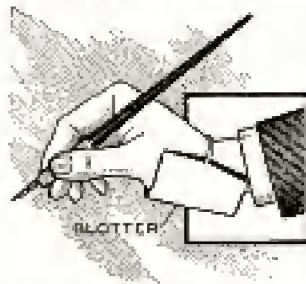
A device for punching identification marks in the pages of books or papers, may be made easily by setting pins into a small box filled with sealing wax. The box should be large enough to accommodate the desired wording without crowding, leaving about  $\frac{1}{4}$  in. all around the edge. Cut the box, which may be of cardboard, to a height  $\frac{1}{8}$  in. less than the length of a common pin. Mark the words to be punched on a piece of cardboard which just fits into the box. Punch holes along the letters and transfer them to the bottom of the



box. Insert pins from the outside through the bottom of the box and permit their ends to come out of the holes in the cardboard guide. Cut away enough of the guide piece so that the melted sealing wax can be poured in, setting the pins firmly. The guide piece is then removed, exposing the ends of the pins about  $\frac{1}{16}$  in. If the work is carefully done they will be of uniform length. Place heavy blotting paper or cardboard under the page when using the punch.—D. G. Stevenson, Chicago, Ill.

### Blotter Attached to Wrist Saves Time

The annoyance of having to look for a misplaced blotter or to pick it up each time a signature is to be blotted, may be avoided by the use of the wrist blotter shown in the sketch. It is made by folding a piece of blotting paper, 6 in. wide and 12 in. long, into three sections. A rubber band is placed in the fold of the blotter and passed around the wrist, thus holding it in place until no longer needed. When one portion of the blotter becomes soiled, the folding may be reversed and a new surface exposed.—Frank W. Roth, Joplin, Mo.



### Celluloid Cover for Road Maps

Road maps are easily soiled and torn unless properly protected, and a satisfactory case to hold them should provide for conveniently examining the map. A piece of transparent celluloid about twice the size of the map when folded can be made into a suitable cover. Fold the celluloid into an envelope form and rivet or sew the ends, leaving the fourth edge open. The map is inserted in the cover with the desired section uppermost, affording protection and ready access at the same time.

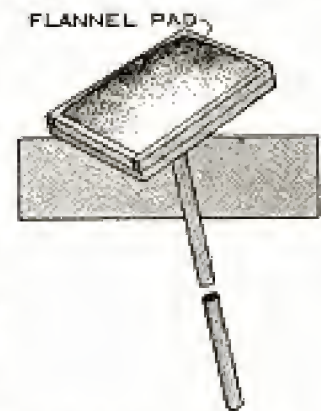
### Shield for Heater in Chick Brooding House

A shield of sheet metal, having a small heater in the center of it, provides a good means of warming a brooding house for small chicks. The heat is radiated from the shield and the chicks remain at a distance, seeking a comfortable temperature. The device may be made easily by cutting a sheet of metal to form a cone-shaped hood and fitting it with a vent passing out through the roof of the house.—Samuel S. Snelbaker, York, Pa.



### Kink for Removal of Wall Paper

Removing old wall paper, particularly from the ceiling of a room, is a disagreeable task at best, and the device shown in the sketch aids in the process. A board, about 15 in. long and 12 in. wide, was provided with strips at its edges and a pad of flannel was fitted into it. The device is used by moistening the pad and applying it to the wall paper. The paper is loosened thoroughly and may be removed in pieces of considerable size. This method has been found much quicker than that of soaking the paper with a moistened brush.—J. H. Moore, Hamilton, Canada.

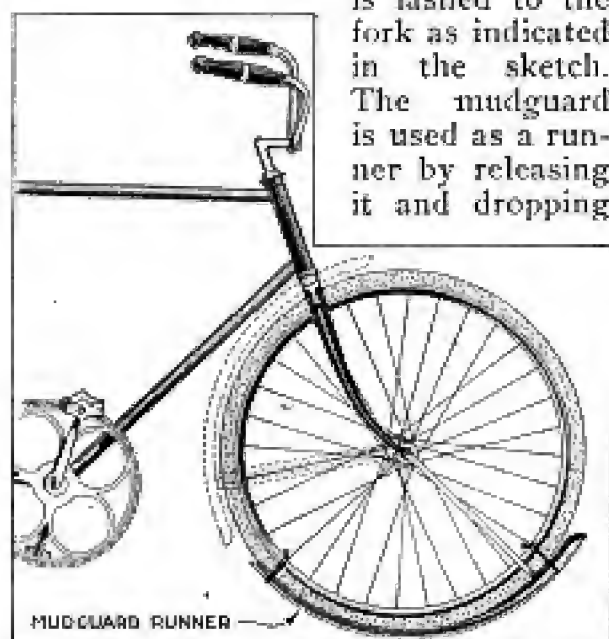


A clay pipe may be used as a crucible for melting small quantities of metal. The stem is broken off and a plug fitted into it.



### Bicycle Runner for Winter Use

A bicycle may be used with satisfactory results in winter by arranging a runner under the front wheel, which

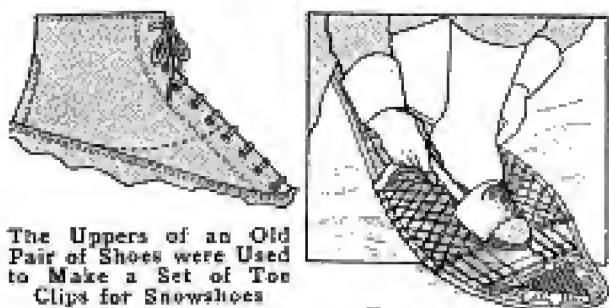


The Mudguard is Fastened to the Rim of the Wheel and Acts as a Runner over Ice and Snow

is lashed to the fork as indicated in the sketch. The mudguard is used as a runner by releasing it and dropping it to the position shown. It is then tied securely to the rim of the wheel and the wheel is tied at the top to the fork. This idea may be adapted by providing a special runner of sheet metal, making it unnecessary to wear the mudguard.—C. H. McCaslin, Portland, Ore.

### Homemade Snowshoe Toe Clips

The uppers from a pair of worn-out shoes may be made into a serviceable set of toe clips for snowshoes by cut-



The Uppers of an Old Pair of Shoes were Used to Make a Set of Toe Clips for Snowshoes

ting them off, as shown in the sketch, and fitting them to the lacing of the snowshoes. The clip is fastened in place by passing the tying strap

through slots in the former, under the lacing of the snowshoe, and then around the ankle in the usual manner of fastening.—Richard F. Lufkin, Dorchester, Mass.

### Mounting Tracing-Cloth Drawings on Muslin

Tracings mounted on muslin will give long wear and are more satisfactory in handling than the unmounted drawings. The method of mounting them is as follows: Stretch a piece of starched muslin, slightly larger than the drawing, on a flat, smooth board, fastening it with tacks. Coat the back of the tracing with a good varnish, and place it, face down, on a flat surface so that it may partly dry and become tacky, which usually takes two hours. Place the tracing upon the stretched muslin, varnished side down, and place a smooth sheet of wrapping paper over it. Using a moderately warm flatiron, and beginning at the center of the tracing, iron toward the edges, applying moderate pressure. To remove the tracing from the cloth, it is necessary to warm the cloth with the iron and strip the tracing and cloth apart gradually.—John W. Grantland, Cincinnati, Ohio.

### Sandpapering Square Edges on Small Machine Bases

The woodwork of small electrical or experimental machines and devices often detracts from the workmanship because proper care is not taken in finishing the edges. To smooth off the ends of a small baseboard squarely, proceed as follows: Square up a piece of 2 by 4-in. stock, 1 ft. long; place a flat sheet of sandpaper on the bench and set the 1-ft. block on top of it, holding it in place with the left hand. Hold the piece to be squared up firmly against the block and rub it on the sandpaper. A square edge of smooth finish will result. The edges should, of course, be planed as smoothly as possible before sanding in this way.—John D. Adams, Phoenix, Ariz.



### Enlarged Lantern Pictures as Guides for Scenic Painting

Scenery for a home-talent theatrical performance was required, and since the services of an expert in that line were not available, an interesting method of obtaining satisfactory sketches for the figures and other objects in the background was devised. Colored lantern slides of scenes suitable for the purpose were selected and projected upon the canvas to be painted, as shown in the illustration. The outlines were drawn around the projected figures, making them as accurate as the original, and far better than would have been possible otherwise by an amateur painter. The colors were applied following the original model, with satisfactory results. By the use



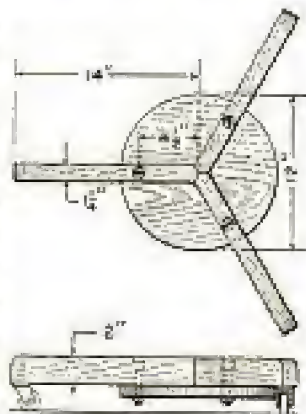
Scenery for an Amateur Theatrical Performance was Made by Painting Outlines Projected from a Lantern

of various portions of slides, it was possible to place figures and outdoor effects on the background which was obtained from the first slide used. A factor which must be considered in using this method is that the picture

on the canvas will be reversed as to right and left positions compared with the original, if a direct-reflection projector of the type used with post cards is employed.—Thomas R. Milligan, Fort Worth, Texas.

### Three-Caster Truck for Moving Crates and Furniture

A convenient truck for handling heavy objects, especially in the home where commercial devices for this purpose are not available, is shown in the illustration. It consists of a frame built up of three  $1\frac{1}{4}$  by 2 by 14-in. strips, fixed to a disk,  $\frac{7}{8}$  by 12 in. in size. Revolving casters are mounted under the ends of the arms, giving great freedom of movement in transporting loads. The three-caster arrangement is better than the use of four casters, because it accommodates itself to irregularities in the floor.—Armydas E. Sturdivant, Muncie, Ind.



¶The burner of an acetylene bicycle lamp, fitted to an ordinary gas jet, will produce a very hot flame.

### Inserting or Correcting on Typewritten Bound Sheets

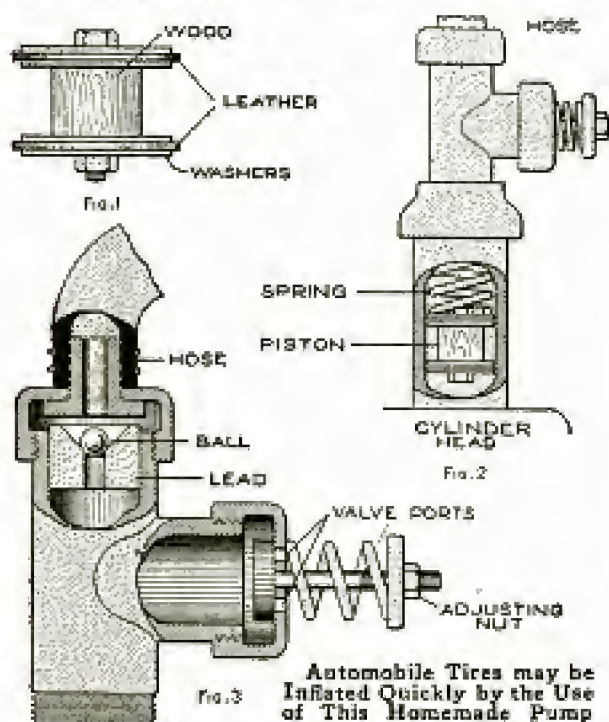
It is frequently necessary that typewritten insertions or corrections be made in papers which have been typed and bound, usually by rivets along the top edge. It is difficult to remove the rivets and replace them satisfactorily. To make such insertions, feed a blank sheet of paper into the typewriter until its feeding edge is even with the upper edge of the guide fingers. Then insert the bottom edge of the sheet on which the correction is to be made, underneath the sheet already in the machine; reverse-feed the sheet to be corrected into the typewriter. Corrections may then be made in the usual manner.—A. J. Cook, Pittsburgh, Pa.

### Tire Pump Made of Gas Piping

A tire pump actuated by the explosions in the cylinder of an automobile engine, and made of materials easily obtainable, is shown in detail in the illustration. A section of iron pipe of a diameter to fit one of the ports, and about 4 in. long, as shown in Fig. 2,



is provided with a reducer, a tee, and two caps. The inside of the pipe is turned up true in a lathe and fitted with a piston, the head for which is



shown in Fig. 1. The head is built up of a wooden drum, washers, and leather packing disks. The washers should be slightly smaller in diameter than the chamber, and the leather disks make it air-tight.

The tee is provided with two valves, as shown in the detail sectional view, Fig. 3, the upper ball valve retaining the pressure in the pipe line, and the other valve admitting air above the piston. The ball valve has a seat of lead, and a ribbed fitting is fixed to the pipe cap above it, to provide a fastening for the hose. The cap of the other valve is fitted with a spring, adjustable on a threaded pin.

A light spring fixed to the upper side of the piston, as shown in Fig. 2, forces the piston back to its lower position after the force of the explosion in the cylinder has acted upon it. The cylinder of the pump should be oiled, and a reinforced rubber hose should be used to conduct the air under pressure to the tire.

The operation is simple: The initial stroke of the engine cylinder draws the piston down, bringing in a charge

of air from the valve ports at the side of the tee; the following compression and explosion strokes drive it back, forcing the air out of the ball valve, as the other valve closes on the upstroke of the piston. A large tire may be pumped up with this device in from five to ten minutes.

### Aid in Ruling Uniform Cards or Sheets

When a number of cards or sheets are to be ruled with either horizontal or vertical divisions, the following method will be found a timesaver: Rule one of the cards as a sample. Place it on the drawing board with its lower edge set against two thumb tacks driven part way in. Rule extensions of the lines on the card to a sheet of paper fastened to the board under the card. Set a third thumb tack at the right edge of the card as a guide. By placing the cards to be ruled against the three thumb tacks in the position of the original card, the rulings may be made quickly with the marks on the paper backing as guides.—W. P. Shaw, Stratford, Can.

### Tinned Staples for Bell-Circuit Wiring

Inexpensive and practical staples for binding wires used in bell circuits, or for similar purposes, may be made from a strip of tinned sheet metal, about  $\frac{1}{2}$  in. wide. The strip is cut on the sides, as indicated in the sketch, and the squares are broken off as needed. They may be bent quickly to the shape shown, and are used by placing them over the wire and driving the



The Strip is Cut into Squares Which are Folded and Driven into the Support, Binding the Wire

points into the wall or other support. If properly made, they will not injure the covering of the wire and are more satisfactory than wire staples.

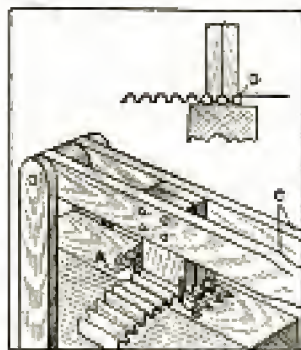


### Asbestos Table Mats Reinforced with Wire Netting

Ordinarily heavy pieces of sheet asbestos are used for the mats placed under hot dishes on the dining table. These are easily broken if bent, and a simple method of overcoming this breakage is to make mats as follows: Cut two pieces of sheet asbestos, each about one-half the thickness of that usually used, one having about  $\frac{3}{4}$  in. around the edge which may be used as a binder in pasting the sheets together. Cut notches into this edge, at intervals of about 2 in., and insert a disk of wire window screening between the pieces of asbestos. Turn the edges of the larger piece over and paste in place.

### Device for Corrugating Strips

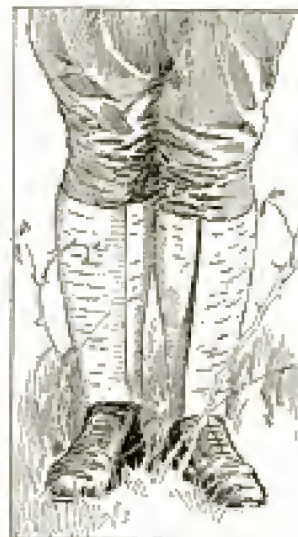
Having a sheet-metal cog rail to make for the adjusting mechanism of an enlarging screen, I built a cog-forming device as shown in the sketch. A block of wood served as the base, and two levers with hinges were fixed to one end of it. Two pieces



of hardwood were grooved at their ends as shown in the smaller sketch, to fit over three tenpenny nails, A, held in place on the block by staples. Four small nails, B, were set into the block, as shown, to act as guides for the strip of metal, which was fed between the forming blocks and the nails on the base. By pressing down on the hinge levers, the strip was formed into corrugations or teeth. In order to make the teeth uniform it was necessary to guide the forming pieces by having one of the cogs fit over the first nail. The strip thus formed was fixed to a wooden piece and served as a cog rail. —R. E. Henderson, Walla Walla, Washington.

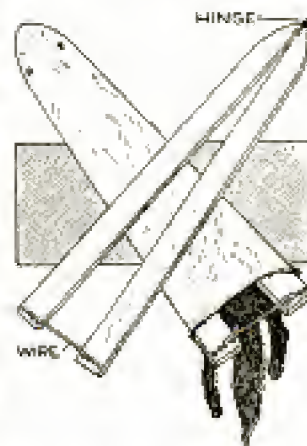
### Birch-Bark Leggings Made in the Woods

An excellent pair of leggings for use in brush and forest land can be made in a few minutes from birch bark cut in the woods. Select a suitable tree, about 6 or 8 in. in diameter, and cut into the heavy bark to obtain two rolls around the circumference of the tree, taking care not to cut deep enough to injure it. Fit these sections around the legs leaving 6-in. portions overlapping. Trim the bark to the proper shape and soak it in water to soften the grain. Place the bark close to the fire until it curls. The leggings are then ready for use.



### Stretcher for Drying Small Fur Hides

Small hides should be dried over a stretcher to give the best results, and the device shown in the sketch will be found useful for this purpose. It is made of two strips of  $\frac{1}{2}$ -in. wood, hinged at the pointed end. Small holes are drilled into the upper surface at the other ends and adjustment is made by means of a wire bent at the ends and inserted in the holes. —Elmer Tetzlaff, East DePere, Wis.



Wire mesh is useful for drawer bottoms in tool cases where dirt is likely to accumulate.



3150

## COMFORTABLE, PLEASING SHINGLED BUNGALOW



Adequate for the Needs of the Average Family of Moderate Circumstances. Attractive, and Comfortable, is This Shingled Bungalow of New England Architecture



F. H. GORING  
ARCHITECT

18 TREMONT ST.  
BOSTON

HEREWITH is illustrated a nine-room shingled bungalow, of the present-day New England type, which may offer a suggestion for the intending builder of a modest, attractive residence. The general arrangement is adequately indicated by the floor plans. An abundance of windows; a simple, pleasing roof

effect, and the popular porch arrangement which

provides a glazed sun parlor in winter and a screened, open veranda in summer, are some of its outstanding points. At one end of the porch is a pergola, 8 by 26 ft. in size, while at the other end a large porte-cochère spans the driveway. This plan gives breadth and architectural charm to the exterior. Dormer windows solve the ceiling problem for the big bedchamber on the second floor and also add needed height to the front of the house. The sloping roof is responsible for the apparently enormous size of the closets, which, it will be observed, are placed in the corners where waste space cannot otherwise be utilized. This bungalow can be built for approximately \$5,000.



# Why Some Foods Explode in the Stomach

By WILLIAM ELDRIDGE

**T**HE combinations of food that most people eat three times a day inflict nothing less than a crime against their health and are the direct cause of 90% of all sickness."

This is the rather startling statement of Eugene Christian, the famous New York Food Scientist, whose wonderful system of corrective eating is receiving so much eager attention throughout the Nation at the present time.

According to Eugene Christian we eat without any thought of the relation which one food has to another when eaten at the same time. The result is that often we combine two foods each of great value in itself but which when combined in the stomach literally explode, liberating toxics which are absorbed by the blood and form the root of nearly all sickness, the first indications of which are acidity, fermentation, gas, constipation, and many other sympathetic ills leading to most serious consequences.

According to Christian, all of this can be avoided if we would only pay a little attention to the selection of our daily menus instead of eating without any regard for the consequences.

This does not mean that it is necessary to eat foods we don't like; instead Christian prescribes meals which are twice as delicious as those to which we are accustomed. Neither does he suggest proprietary or patented foods—he simply tells us which foods when eaten together produce health and energy by removing the cause of sickness.

Not long ago I was fortunate enough to be present when Eugene Christian was relating some of his experiences with corrective eating to a group of men interested in dietetics, and I was literally amazed at what he accomplished

with food alone and without drugs or medicines of any kind.

One case which sticks in my mind was that of a mother and daughter who went to him for treatment. The mother was forty pounds overweight and her physician diagnosed her case as Bright's Disease. She had a sluggish liver, low blood pressure and lacked vitality. The daughter had an extreme case of stomach acidity and intestinal fermentation, was extremely nervous, had chronic constipation, and was thirty pounds underweight.

Christian prescribed the proper food combinations for each. Within a few weeks all symptoms had disappeared, and within three months the mother had lost 33 pounds and the daughter had gained 26 pounds, and both were in perfect health—normal in every particular.

Another case which interested me greatly was that of a young man whose efficiency had been practically wrecked through stomach acidity, fermentation and constipation resulting in physical sluggishness which was naturally reflected in his ability to use his mind. He was 20 pounds underweight when he first went to see Christian and was so nervous he couldn't sleep. Stomach and intestinal gases were so severe that they caused irregular heart action and often fits of great mental depression. As Christian describes it he was not 50% efficient either mentally or physically. Yet in a few days, by following Dr. Christian's suggestions as to food, his constipation had completely gone, although he had formerly been in the habit of taking large daily doses of a strong cathartic. In five weeks every abnormal symptom had disappeared—his weight having increased 6 pounds. In addition to this he acquired a store of physical and mental energy so great in comparison with his former self as to almost belie the fact that it was the same man.



But perhaps the most interesting case that Christian told me of was that of a multi-millionaire—a man 70 years old who had been traveling with his doctor for several years in a search for health. He was extremely emaciated, had chronic constipation, lumbago and rheumatism. For over twenty years he had suffered with stomach and intestinal trouble which in reality was superaciduous secretions in the stomach. The first menus given him were designed to remove the causes of acidity, which was accomplished in about thirty days. And after this was done he seemed to undergo a complete rejuvenation. His eyesight, hearing, taste and all of his mental faculties became keener and more alert. He had had no organic trouble—but he was starving to death from malnutrition and decomposition—all caused by the wrong selection and combination of foods. After six months' treatment this man was as well and strong as he had ever been in his life.

These instances of the efficacy of right eating I have simply chosen at random from perhaps a dozen Eugene Christian told me of, every one of which was fully as interesting and they applied to as many different ailments. Surely this man Christian is doing a great work.

I know of several instances where rich men and women have been so pleased with what he has done for them that they have sent him checks for \$500 to \$1,000 in addition to the amount of the bill when paying him.

There have been so many inquiries from all parts of the United States from people seeking the benefit of Eugene Christian's advice and whose cases he is unable to handle personally that he has written a little course of lessons which tells you exactly what to eat for health, strength and efficiency. This course is pub-

lished by The Corrective Eating Society of New York.

These lessons—there are 24 of them—contain actual menus for breakfast, luncheon and dinner, curative as well as corrective, covering every condition of health and sickness from infancy to old age and for all occupations, climates and seasons.

Reasons are given for every recommendation based upon actual results secured in the author's many years of practice, although technical terms have been avoided. Every point is explained so clearly that there can be no possible misunderstanding.

With these lessons at hand it is just as though you were in personal contact with the great food specialist, because every possible point is so thoroughly covered that you can scarcely think of a question which isn't answered. You can start eating the very things that will produce the increased physical and mental energy you are seeking the day you receive the lessons and you will find that you secure results with the first meal.

If you would like to examine these 24 Little Lessons in Corrective Eating simply write The Corrective Eating Society, Dept. 52, 460 Fourth Ave., New York City. It is not necessary to enclose any money with your request. Merely ask them to send the lessons on five days' trial with the understanding that you will either return them within that time or remit \$3.00, the small fee asked.

The reason that the Society is willing to send the lessons on free examination without money in advance is because they want to remove every obstacle to putting this knowledge in the hands of the many interested people as soon as possible, knowing full well that a test of some of the menus in the lessons themselves are more convincing than anything that can possibly be said about them.

*Please clip out and mail the following form instead of writing a letter, as this is a copy of the official blank adopted by the Society and will be honored at once*

#### CORRECTIVE EATING SOCIETY

Dept. 52, 460 Fourth Avenue, New York City

You may send me a prepaid copy of Corrective Eating in 24 Lessons. I will either remail them to you within five days after receipt or send you \$3.

Name..... Address.....  
City..... State.....

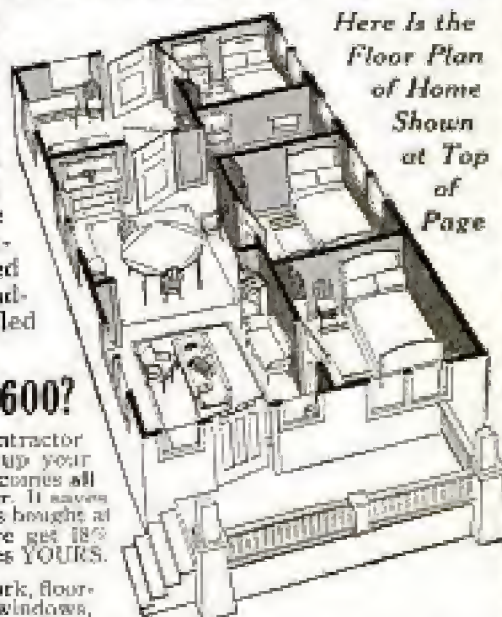


# \$687 for this 6-Room ALADDIN



## Your Own Home—Build It This Year

**H**ERE is your opportunity to own a home and dodge high building prices. You can do it even though building prices are going up! THE ALADDIN READI-CUT SYSTEM of building stands between you and present high prices. It offers you this ideal home or one hundred other attractive homes at substantial savings in price. Think of the home pictured above containing large living room and dining room, large kitchen, three large bedrooms, bathroom and porch for \$687 for complete material, readi-cut. This is only one of a hundred homes with prices from \$200 to \$8000 shown in the handsome book. Let us send you a copy of this book entitled "Aladdin Homes." Send stamps today for your copy.



Here is the  
Floor Plan  
of Home  
Shown  
at Top  
of  
Page

### Why Pay \$900 for a Home That You Can Buy for \$600?

Why hand over three hundred dollars of your savings to a contractor when you can keep that money by having any carpenter put up your Aladdin Read-Cut Home? Your staunch, beautiful Aladdin Home comes all ready for building—complete to the last lock screw in the front door. It saves you money because the lumber is cut by machinery—the materials bought at wholesale. The daily capacity of our mills is 40 Aladdin Homes—we get 18% more out of our lumber than any builder. This great saving becomes YOURS.

**What You Get** Aladdin price includes all lumber, millwork, flooring, outside and inside finish, doors, windows, shingles, lath and plaster, hardware, locks, nails, paint, varnishes. Your home is shipped in a sealed box car, complete, Read-Cut, ready to erect. Safe arrival of the complete material in perfect condition is guaranteed. Floor plan arrangement and complete description of the house shown above will be found in the Aladdin Book of Homes. Send stamps today for the book, "Aladdin Homes," No. 180.

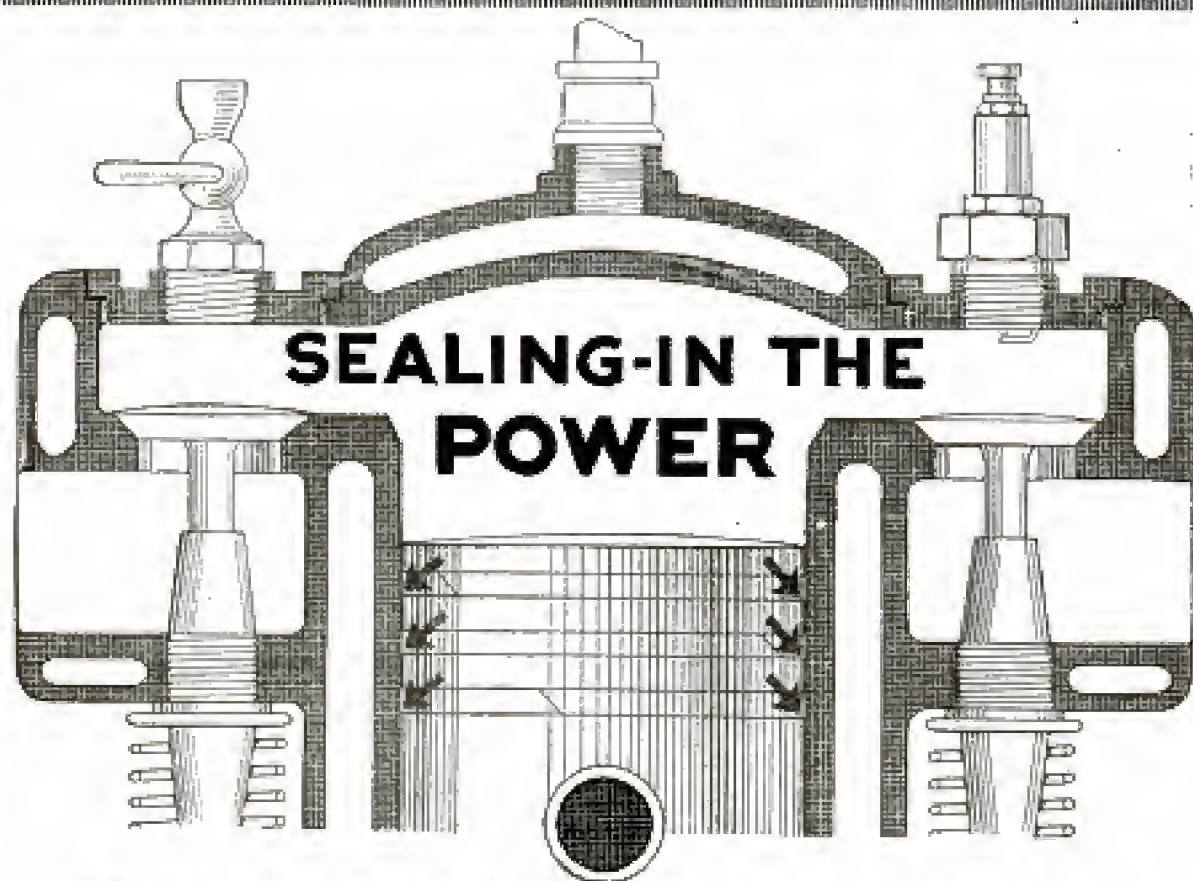
## The Aladdin Company

Homebuilders to the Nation  
Canadian Branch C. P. R. Bldg., TORONTO, ONT.

828 Aladdin Ave., Bay City, Mich.







## *Keep the fuel charge where it belongs*

**D**RIP! Drip! Drip! If an accident puts a leak in your gasoline tank, you quickly notice it. The evidence is plain.

But there is another much more serious, and far more common form of leakage. That is leakage of the fuel charge past the piston rings.

No. You can't *see* it. Nor is there usually any tell-tale sound. Every thing *seems* the same as usual. But gas *is* leaking—leaking steadily.

How? Between piston, piston rings and cylinder wall is a small clearance. When you use

the correct oil in your engine this clearance is sealed.

The oil closes it up, effectively retaining the fuel charge above the piston.

But suppose the body of the oil is incorrect. What happens? Only a partial oil seal results.

On compression, part of the fuel charge escapes down past the piston rings. On the power stroke, part of the explosion escapes by the same path.

True, the leakage per stroke is small. But multiplied by over 20,000 piston strokes per mile in the average 4-cylinder motor and the total leakage is clearly a factor to be reckoned with. It tells plainly



in gas consumption per mile. Gargoyle Mobiloils used as specified often cut previous gasoline consumption figures from 10% to 20%. Almost invariably the oil consumption also drops immediately.

### An Economical Demonstration

It will probably cost you less than \$1 to fill your reservoir with the grade of Gargoyle Mobiloils specified for your car. The garage or dealer you trade with has it, or can promptly secure it for you.

Ask him to empty your reservoir of its present oil and fill it with the correct grade of Gargoyle Mobiloils. You can then judge for yourself, the results in—gasoline economy and reduced oil consumption, to say nothing of reduced carbon deposit.

If your car is not listed in the partial Chart to the right, a copy of our "Correct Lubrication" booklet containing the complete Chart will be sent you on request.



# Mobiloils

*A grade for each type of motor*

The four grades of Gargoyle Mobiloils for gasoline motor lubrication, purified to remove free carbon, are:

**Gargoyle Mobiloil "A"**  
**Gargoyle Mobiloil "B"**  
**Gargoyle Mobiloil "E"**  
**Gargoyle Mobiloil "Arctic"**

**Electric Vehicles**—For motor bearings and enclosed chains use Gargoyle Mobiloil "A" the year 'round. For open chains and differential use Gargoyle Mobiloil "C" the year 'round. **Exception**—For winter lubrication of pleasure cars use Gargoyle Mobiloil "Arctic" for worm drive and Gargoyle Mobiloil "A" for bevel gear drive.

In buying Gargoyle Mobiloils from your dealer, it is safest to purchase in original packages. Look for the red Gargoyle on the container. For information, kindly address any inquiry to our nearest office.

**VACUUM OIL COMPANY**  
 Rochester, N. Y., U. S. A.

Specialists in the manufacture of high grade lubricants for every class of machinery. Obtainable everywhere in the world.

**Domestic Branches:** Detroit Chicago Minneapolis  
 Boston Philadelphia Pittsburgh  
 New York Indianapolis Kansas City, Kan.  
 Des Moines

### Correct Automobile Lubrication

**Explanation:** In the Chart below, the letter opposite the car indicates the grade of Gargoyle Mobiloils that should be used. For example, "A" means Gargoyle Mobiloil "A," "Arc" means Gargoyle Mobiloil "Arctic," etc. The recommendations cover all models of both pleasure and commercial vehicles unless otherwise noted.

MODEL OR CAR	1916	1917	1918	1919	1920
Alfa Romeo (1916)	A	A	A	A	A
Alfa Romeo (1917)	A	A	A	A	A
Alfa Romeo (1918)	A	A	A	A	A
Alfa Romeo (1919)	A	A	A	A	A
Alfa Romeo (1920)	A	A	A	A	A
Alfa Romeo (1921)	A	A	A	A	A
Alfa Romeo (1922)	A	A	A	A	A
Alfa Romeo (1923)	A	A	A	A	A
Alfa Romeo (1924)	A	A	A	A	A
Alfa Romeo (1925)	A	A	A	A	A
Alfa Romeo (1926)	A	A	A	A	A
Alfa Romeo (1927)	A	A	A	A	A
Alfa Romeo (1928)	A	A	A	A	A
Alfa Romeo (1929)	A	A	A	A	A
Alfa Romeo (1930)	A	A	A	A	A
Alfa Romeo (1931)	A	A	A	A	A
Alfa Romeo (1932)	A	A	A	A	A
Alfa Romeo (1933)	A	A	A	A	A
Alfa Romeo (1934)	A	A	A	A	A
Alfa Romeo (1935)	A	A	A	A	A
Alfa Romeo (1936)	A	A	A	A	A
Alfa Romeo (1937)	A	A	A	A	A
Alfa Romeo (1938)	A	A	A	A	A
Alfa Romeo (1939)	A	A	A	A	A
Alfa Romeo (1940)	A	A	A	A	A
Alfa Romeo (1941)	A	A	A	A	A
Alfa Romeo (1942)	A	A	A	A	A
Alfa Romeo (1943)	A	A	A	A	A
Alfa Romeo (1944)	A	A	A	A	A
Alfa Romeo (1945)	A	A	A	A	A
Alfa Romeo (1946)	A	A	A	A	A
Alfa Romeo (1947)	A	A	A	A	A
Alfa Romeo (1948)	A	A	A	A	A
Alfa Romeo (1949)	A	A	A	A	A
Alfa Romeo (1950)	A	A	A	A	A
Alfa Romeo (1951)	A	A	A	A	A
Alfa Romeo (1952)	A	A	A	A	A
Alfa Romeo (1953)	A	A	A	A	A
Alfa Romeo (1954)	A	A	A	A	A
Alfa Romeo (1955)	A	A	A	A	A
Alfa Romeo (1956)	A	A	A	A	A
Alfa Romeo (1957)	A	A	A	A	A
Alfa Romeo (1958)	A	A	A	A	A
Alfa Romeo (1959)	A	A	A	A	A
Alfa Romeo (1960)	A	A	A	A	A
Alfa Romeo (1961)	A	A	A	A	A
Alfa Romeo (1962)	A	A	A	A	A
Alfa Romeo (1963)	A	A	A	A	A
Alfa Romeo (1964)	A	A	A	A	A
Alfa Romeo (1965)	A	A	A	A	A
Alfa Romeo (1966)	A	A	A	A	A
Alfa Romeo (1967)	A	A	A	A	A
Alfa Romeo (1968)	A	A	A	A	A
Alfa Romeo (1969)	A	A	A	A	A
Alfa Romeo (1970)	A	A	A	A	A
Alfa Romeo (1971)	A	A	A	A	A
Alfa Romeo (1972)	A	A	A	A	A
Alfa Romeo (1973)	A	A	A	A	A
Alfa Romeo (1974)	A	A	A	A	A
Alfa Romeo (1975)	A	A	A	A	A
Alfa Romeo (1976)	A	A	A	A	A
Alfa Romeo (1977)	A	A	A	A	A
Alfa Romeo (1978)	A	A	A	A	A
Alfa Romeo (1979)	A	A	A	A	A
Alfa Romeo (1980)	A	A	A	A	A
Alfa Romeo (1981)	A	A	A	A	A
Alfa Romeo (1982)	A	A	A	A	A
Alfa Romeo (1983)	A	A	A	A	A
Alfa Romeo (1984)	A	A	A	A	A
Alfa Romeo (1985)	A	A	A	A	A
Alfa Romeo (1986)	A	A	A	A	A
Alfa Romeo (1987)	A	A	A	A	A
Alfa Romeo (1988)	A	A	A	A	A
Alfa Romeo (1989)	A	A	A	A	A
Alfa Romeo (1990)	A	A	A	A	A
Alfa Romeo (1991)	A	A	A	A	A
Alfa Romeo (1992)	A	A	A	A	A
Alfa Romeo (1993)	A	A	A	A	A
Alfa Romeo (1994)	A	A	A	A	A
Alfa Romeo (1995)	A	A	A	A	A
Alfa Romeo (1996)	A	A	A	A	A
Alfa Romeo (1997)	A	A	A	A	A
Alfa Romeo (1998)	A	A	A	A	A
Alfa Romeo (1999)	A	A	A	A	A
Alfa Romeo (2000)	A	A	A	A	A





## Good Value—Always Growing Greater

As the improvements are made in Dodge Brothers car nothing is said to Dodge Brothers dealers, or to the public, about them.

This is in pursuance of a policy inaugurated by Dodge Brothers at the very outset.

They look upon the progressive improvement of the car as a matter of course.

It is a plain duty they owe to themselves and to the public.

There is no necessity of heralding these improvements in advance.

The public finds out about them in due time, and expresses appreciation and approval.

And so, while the process of betterment goes on every day, nothing is said of it until after it is accomplished.

The car is basically the same car as it was two years ago.

Yet there isn't a bit of doubt but that it is a better car.

The car of today is worth more money than the car of two years ago.

The price is the same, but the car is a better car.

Not because the costs of materials have increased—although they have.

But especially because the standards of construction have been steadily raised—the shop practice made steadily finer.

And still, the buyers of the first cars, and every subsequent car, received full value.

That is proven by the fact that all of the cars, no matter how long ago they were built, are giving good service today.

It is still further proven by the high price they command when sold at second hand.

Any car built by Dodge Brothers commands a high price—whether it was built twenty-two months, or twelve months, or two months ago.

This high valuation on any car bearing Dodge Brothers name, has been fixed, not by them, but by the public.

Dodge Brothers have had few market problems to bother them, and practically nothing to do but make the car better.

They are their own severest critics, and they will never wait for the public to ask for a better car from them.

They try to anticipate—to travel ahead—to give even more than is expected.

No material, no part, and no accessory is barred from Dodge Brothers car because it is too high priced.

The only question asked, the only proof demanded, is of its goodness.

When the car was designed, its parts were chartered and chosen according to quality, and with a total disregard of price.

That policy still prevails, only it has been intensified.

No source of supply can have too high a standard for Dodge Brothers—nothing too good can be offered for Dodge Brothers car.

That policy, plus a process of research, test, refinement and proof, make for continuous progress.

That is why it is still the same car, and yet a much finer car.

That is why it is worth more money than ever, though still sold at the same price.

That is why its value is always growing greater.

Touring Car or Roadster, \$785 In Canada \$1100  
 Winter Touring Car or Roadster, \$950 In Canada \$1335  
 Sedan, \$1125 In Canada \$1565  
*All prices f. o. b. Detroit*

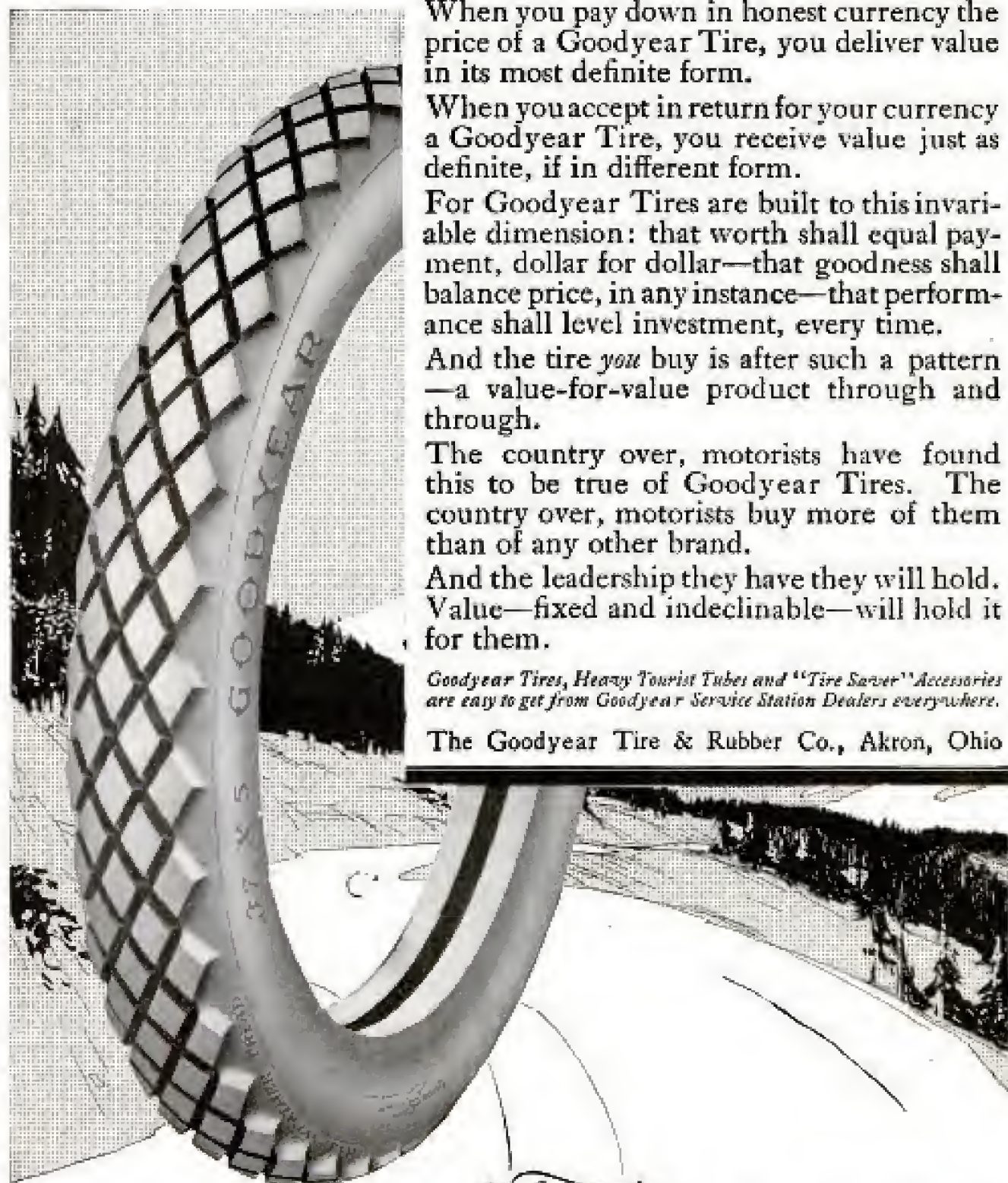
**DODGE BROTHERS, DETROIT**



*Please Mention Popular Mechanics*



*At the Timber Line on the Pike's Peak  
Automobile Highway*



## Your Dollars and Our Tires

When you pay down in honest currency the price of a Goodyear Tire, you deliver value in its most definite form.

When you accept in return for your currency a Goodyear Tire, you receive value just as definite, if in different form.

For Goodyear Tires are built to this invariable dimension: that worth shall equal payment, dollar for dollar—that goodness shall balance price, in any instance—that performance shall level investment, every time.

And the tire *you* buy is after such a pattern—a value-for-value product through and through.

The country over, motorists have found this to be true of Goodyear Tires. The country over, motorists buy more of them than of any other brand.

And the leadership they have they will hold. Value—fixed and indeclinable—will hold it for them.

*Goodyear Tires, Heavy Tourist Tubes and "Tire Saver" Accessories are easy to get from Goodyear Service Station Dealers everywhere.*

The Goodyear Tire & Rubber Co., Akron, Ohio

**GOODYEAR**  
AKRON

*Please Mention Popular Mechanics*





## What's in a Bottle of 3-in-One Oil

If every family in the United States knew what was in a bottle of 3-in-One, *for them*, years of labor and millions of dollars would be saved. Here are some of the *in-side* facts.

**For Father:** 3-in-One will double the life of father's safety razor blades and make shaving easier and more pleasant. Before and after shaving moisten thumb and finger with 3-in-One and draw edge of blade between them. This prevents rust on the invisible cutting edge. In father's office 3-in-One keeps typewriters, adding machines and all light mechanisms running smoothly. It prevents automobile springs from squeaking. On all tools 3-in-One stops rust from forming; keeps them sharp and working right.

**For Mother:** 3-in-One is a wonderful household aid. Mother can make her own Dustless Dusting Cloths cheaply, quickly, perfectly. Take a half yard of cheese-cloth. Sprinkle with 3-in-One. Let stand till the oil has permeated every part of the cloth. A Polish Mop is just as easy to make. Mother also should use 3-in-One for oiling her sewing machine, polishing mirrors, cleaning her gas range, and for countless other home purposes. See Dictionary of Uses.

**For Son:** 3-in-One Oil makes a bicycle go twice as fast and wear twice as long. It makes a baseball glove hold the ball, roller skates whiz, keeps knives sharp and has fifty other uses. No real boy should be without 3-in-One.

**For Daughter:** 3-in-One keeps the young lady's tennis racket in perfect condition and her golf clubs right. Or if daughter operates a typewriter 3-in-One will make it work smoothly, surely and very much easier. See 3-in-One Dictionary.

**For Baby:** 3-in-One keeps the go-cart from squeaking and makes it run twice as easy.

**FREE**—Send for the *In-side* Facts. Get a sample of 3-in-One and the Dictionary of Uses. Simply drop us a postal saying, "Send *In-side* Facts." Do it now before you forget.

3-in-One is sold by all stores. In bottles, 10c, 25c, 50c. In Handy Oil Can, 25c.

**Three-in-One Oil Company, 42 CNP. Broadway, New York**



# San-Tox



## This Face Will Protect Yours

Smoothly the razor draws across the face and you feel the shaving-joy at once.

Yet there is more than simply razor-keenness there. There is a purity lather not very far away.

San-Tox for purity!

Try San-Tox Shaving Cream for the comfort of its lasting, soothing lather.]

Try San-Tox Shaving Lotion for the cooling, refreshing tonic of its touch.

Try San-Tox After-Shave Talc, that smoothes out all skin-roughness and suggests the barbed shave.

But then, on any packet of San-Tox blue the smiling San-Tox Nurse face tells the same purity story, just as does each San-Tox druggist by his offer to return you your money on any San-Tox preparation which does not equal your every expectation.

What better proof of San-Tox purity could you get?

What better indication of modern drug-store methods could you have, or of a type of druggist with which it is good to do business?

There are 125 San-Tox purity preparations.

SAN-TOX FOR PURITY  
De Pree Chicago

This Drug Store Sign



Means Better Service



Please Mention Popular Merchants



# If you are thirty years old



the small sum of \$1.91 (monthly) secures for you a policy for \$1000 in the Postal Life Insurance Company—a standard, legal-reserve Whole-Life Policy, with guaranteed Cash, Loan, Paid-up and Endowment Options, and participation in the Company's surplus earnings.

Every year, during the premium-paying period, you save nine and one-half per cent. of the annual premium as *guaranteed in the policy* (see mail-bag below).

These savings are made possible only because the Postal Life employs no agents and *has no agency expense*; the benefit of this decisive economy goes to the person who takes out the insurance.

## Strong Postal Points

**First:** Resources more than \$9,000,000. Insurance in force, nearly \$40,000,000.

**Second:** Old-line, legal-reserve insurance, not fraternal or assessment.

**Third:** Standard policy provisions, approved by the New York State Insurance Department.

**Fourth:** Operates under strict New York State requirements and subject to the United States Postal Authorities.

**Fifth:** High medical standards in the selection of risks.

**Sixth:** Policyholders' Health Bureau supplies one free medical examination each year, if desired.

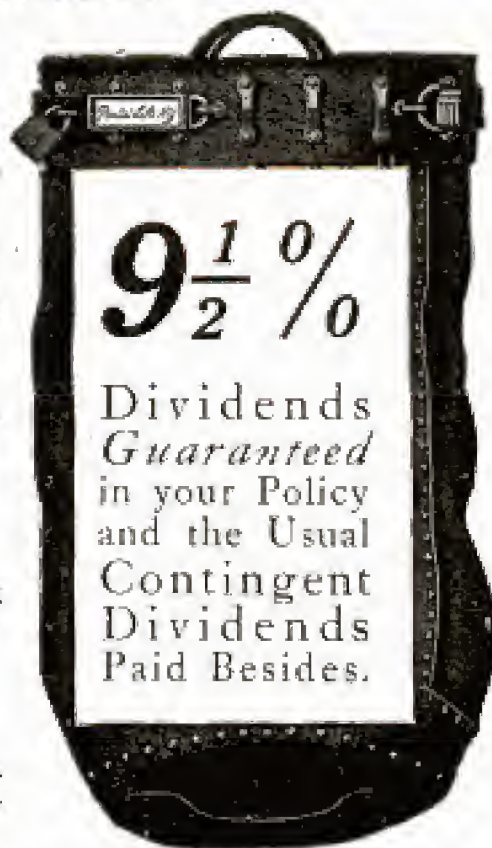
## Find Out What You Can Save at Your Age

Simply write and say: "Mail official insurance particulars as per Advertisement in February Popular Mechanics Magazine."

And be  
sure  
to give

1. Your full name.
2. Your occupation.
3. The exact date of your birth.

And bear in mind: No agent will be sent to visit you. The Postal Life does not employ agents; the resulting commission-savings go to you because you deal direct.



# Postal Life Insurance Company

WM. R. MALONE, PRESIDENT

511 Fifth Avenue, NEW YORK



# Warm Moistair

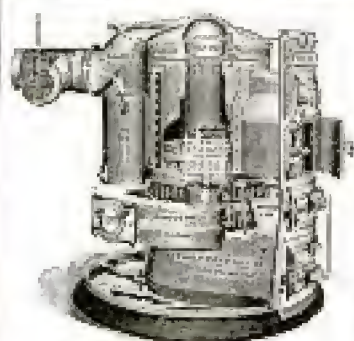
## The Safer Way to Heat Your Home

WHEN the cold blasts of winter make the timbers creak and the children are shut up inside, there is nothing half so comforting as to know that down in the basement there's a trusty *Round Oak Moistair Heating System* on the job. The

## Round Oak Moistair Heating System

keeps a constant current of delightfully warm, clean, fresh air circulating throughout the house. It also humidifies this air—keeps it moist and healthful, free from dirt, dust, gas and is

## The Only Heating System That Automatically Ventilates and Humidifies



### Five Star Points of Round Oak Supremacy

- ★ **Health** Only Heating System that automatically ventilates and HUMIDIFIES.
- ★ **Comfort** Delivers pure, warm, ever-changing moistair, free from dust, gas, smoke—fitted with gas-tight doors and dampers.
- ★ **Economy** Longest fire travel all inside casing; improved hot blast *Stag*; extra deep fire pot; extra large combustion chamber affords perfect combustion; most heating minimum fuel.
- ★ **Convenience** Simple regulator controls entire system. Self-cleaning. Ash pot dust-proof—crackless; fitted with sprinkler. Non-leak door flanges cast on—pat. rolled. Easy to operate.
- ★ **Durability** Materials used stand highest physical tests. All hinge pieces drilled, not cast. Never a bolt where a rivet will do! Tight fittings guaranteed. Good for generation of stove.

When you replace your present heating plant, or build, insist on this most healthful system.

It banishes all health-dangers due to stale, breathed-over, poisonous air—is durable—easy to operate—easy to keep clean. Humid air at 68 degrees is more comfortable than DRY air at 75. This fact together with the saving effected by other Round Oak features means literally a saving of tons of fuel. Note in panel opposite other exclusive features! More than 50,000 Round Oak Systems in use. You know the Round Oak STOVE! The Round Oak Heating System is made by the same makers; and is backed by over 45 years' experience. Investigate.

### VALUABLE BOOK—FREE

also complete *Heating Plan* drawn up by Round Oak Engineering Experts to meet your needs. Book fully explains System—contains Blank which filled out and returned to us brings you without obligation. Plan, full costs, and name of our nearest dealer. Write for book—now.

Sold by many dealers on easy terms. To get the Genuine, insist upon the Trade-mark showing the Round Oak Indian.

## The Beckwith Company Round Oak Folks

16 Front Street, Dowagiac, Michigan

Established 1871



Clip This Coupon and Mail NOW

Is Front Street, Dowagiac, Michigan

Send me without obligation, a book and plan explaining your Round Oak Moistair Heating System.

Name.....

Address.....





## The Man on the Dock

**D**OWN on a dock at New York, where ships come from afar to discharge their cargoes of crude rubber, is a man with a strange occupation.

He goes from case to bale marking the rubber.

His wonderful skill rejects or accepts the rubber according to its fitness, and the best of it goes to 47 factories of the United States Rubber Company, **the largest rubber manufacturer in the world.**

The man on the dock is the outpost of a scientific organization, a magnificent body of **260 chemists**, engineers and other technically trained men, who, with **841 inspectors**, stand guard over the integrity of the rubber goods made by the United States Rubber Company.

When the rubber moves from dock to factory it meets the advance guard of these men. They sample and test it by the most exacting methods known to the chemistry and physics of rubber. They divide it into classes according to the varying characteristics of its parts. They blend and treat each huge class to make it uniform.

They select and mix these different classes of rubber to get just the combination of desired properties.

This is because each kind of goods made—tires, shoes, garden hose—

demand its own peculiar group of specialized characteristics.

As these various products move through the factory, they pass at every step under the keen eyes of inspectors, alert for flaws and faults.

But not yet do they reach the selling force. The finished factory products are tested repeatedly to see that they conform to the quality standard set for strength, elasticity, softness, resistance to wear, and the effect of heat and light. They are run on special machines that in a few hours duplicate the wear and tear of months of use; and finally pass the last ordeal of severe actual service tests.

The consummation of all this skill and care is found in every product you buy under the United States Rubber Company's trade-marks.

From the forest tree to the purchaser, this scientific control shines out in all our enormous production—all styles of rubber footwear; canvas rubber-soled shoes; weatherproof clothing; tires for automobiles, motor trucks and all other vehicles; druggists' rubber goods; insulated wire; soles and heels; belting, hose, packing, mechanical and moulded rubber goods of every description.



# United States Rubber Company

*Please Mention Popular Mechanics*



# I Want To Make You A Present of This Acorn Uni-Lite!

And I Am Organizing an Army  
of Money-Winners! Do You Want to Join?

Yes—you get the Uni-Lite without paying a penny for it.

But that's not all! I want to help you join my army of money-winners—my big band of men who are "winning money" without interfering with their present work—without doing much of anything except calling on their fellow townspeople and talking neighbor-like to them.

I want to tell you all about it. But, before I can do that, I want you to send me your name and address on the coupon (or a post card) so I will know where to mail you complete information telling you how you get your Acorn Uni-Lite **free**.

## The Light That Shames Electricity

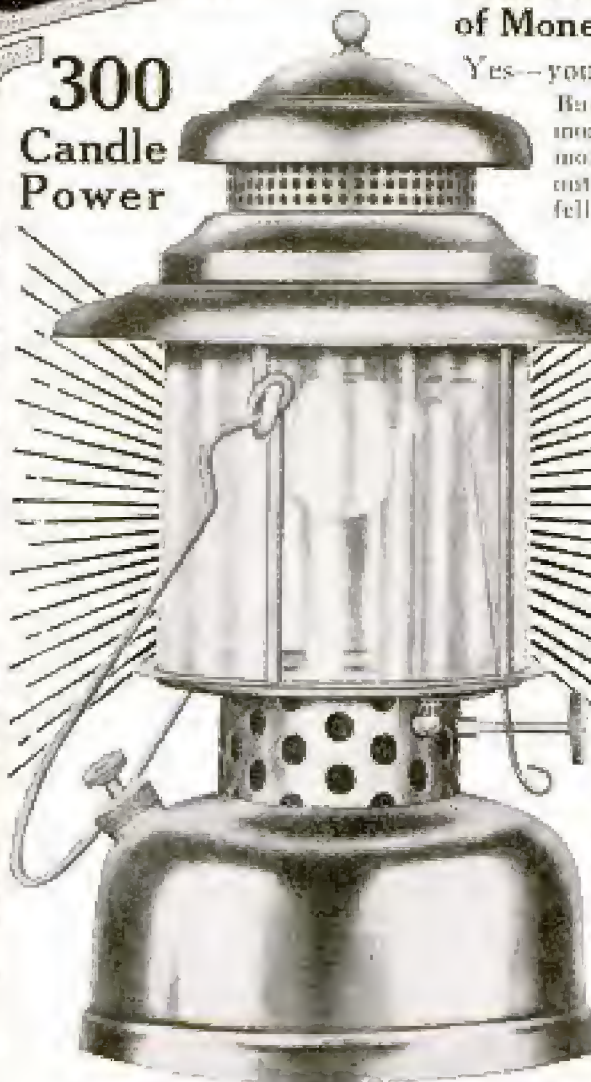
A new and astonishing light. Thousands reported to foreign countries every month! Adopted by U. S. forces along borders!

Gives brilliant, steady radiance equal to the combined light of 20 ordinary kerosene or lamp. Burns 15 hours on one filling! Costs only  $\frac{1}{16}$  of a penny per hour. Burns common kerosene or gasoline. Storm-proof, bug-proof, rain, sleet and snow-proof. Use as a lamp—or carry as a lantern. Handsome in finish—neat in design—durable in construction. A wonderful light for in and around homes—factories—garages—bars—shops—in camps—driving on dark roads—boating—for night watchmen—hunters, railroad men, etc. And my New 1917 flyer tells you how you can get one free.

Just Answer This Ad—Just Follow My Plan—I'll Show You and Back You!

Just the same as I have done for thousands of other men—men just like yourself. It's no trick at all. Anyone can succeed with this plan for making money. It's simple and straightforward. I'll tell you all about it, just as soon as you send me your name and address. Don't put this off. Do it now. It won't take a minute.

**300  
Candle  
Power**



ADDRESS

**Acorn Brass Mfg. Co.**

*Clyde E. Padden*  
SALES MANAGER

616 Uni-Lite Bldg., Chicago, Ill.

**How  
To Get An  
ACORN  
UNI-LITE  
FREE**



**ACORN BRASS MFG. CO.**

**Clyde E. Padden, Sales Manager, 616 Uni-Lite Bldg., Chicago, Ill.**

Name

R. R. or Street No.

CITY

State



See Editorial p. 190

# Ends *all* Your Spark Plug Trouble

Here, at last, is the one practical idea in detachable spark plugs. No more putting around in the grease with wrenches—no more broken porcelains—no more necessity for letting your spark plugs remain dirty. It's the simplest thing in the world to remove this plug from the cylinder. You simply lift up the bail, give the plug a slight turn and out it comes. Think of the conveniences of being able to lift up the head of your motor and turn the plug  $\frac{1}{2}$  of an inch, and have it before you, ready to inspect or clean, if necessary. You can do this without even loosening the high tension wires.



## P-D-Q PLUG DETACHES QUICKLY SPARK PLUG

The construction of the P. D. Q. is extremely simple, there being only two parts—the shell which screws into the cylinder of the motor and the porcelain which fits into the spark plug shell and is locked there securely by means of the bail. (See illustration). Porcelain of the highest grade.

The P. D. Q. makes the ideal priming plug. Can be removed in ten seconds and gasoline squirted in right at the firing point—more effective than priming through pet cocks.

Easy to clean, easy to inspect and gives a hot, fat spark that will produce maximum efficiency from every charge of gas.

The construction is such that no gasket is necessary—the crown joint holds absolutely tight and the P. D. Q. never leaks or loses compression. Rigorously tested for two years.

Made with standard  $\frac{1}{2}$  inch thread or with  $\frac{3}{8}$  inch S. A. E. or A. L. A. M.

### TRIAL OFFER—Four for \$4.00

These plugs are guaranteed to give satisfactory service

We would like to give you the opportunity of trying them out in your own car.

If not obtainable at your dealer's, send us an order for four plugs, and we will mail them to you, all charges prepaid. Extra porcelains are obtainable at any time at 75 cents each. Get your order in today.

**THE WOLVERINE SPARK PLUG COMPANY**  
800 Boydell Bldg. DETROIT, MICH.

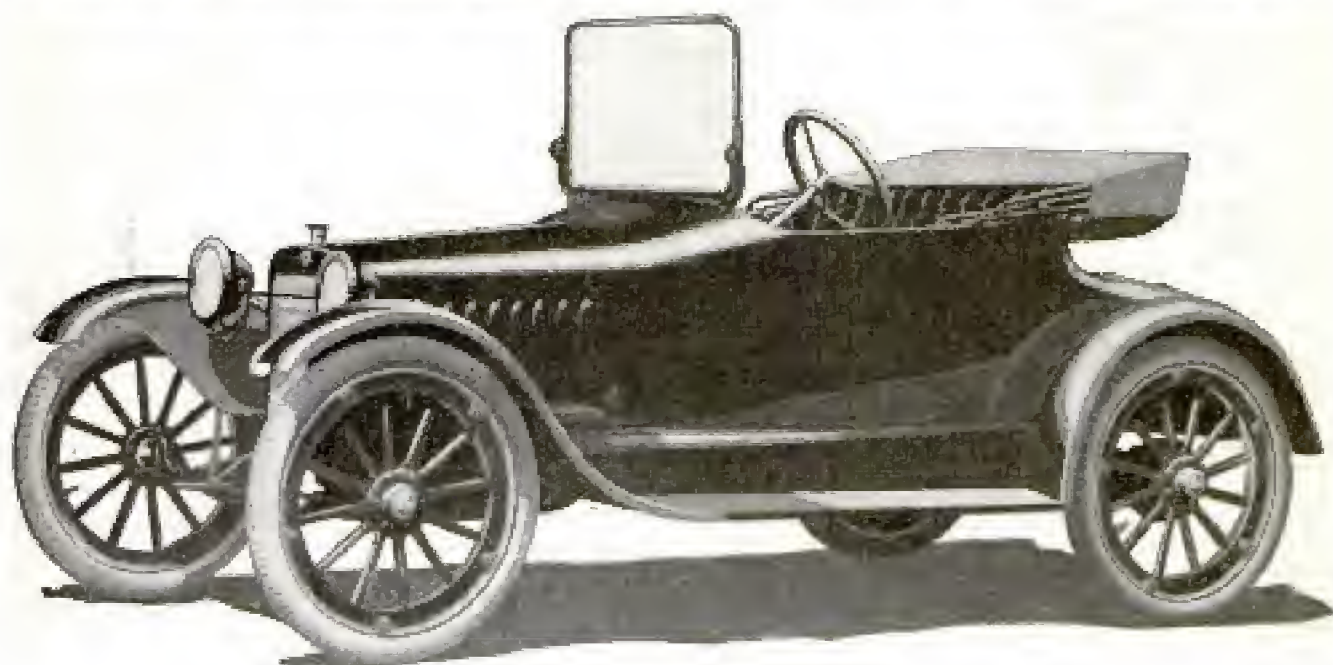


Please Mention Popular Mechanics



# SAXON ROADSTER

A CAR COMPLETELY EQUIPPED WITH EVERY MODERN FEATURE



## A Car Completely Equipped to the Last Detail for Less Than \$500

By all means see this new series Saxon Roadster. You will find it no ordinary car. We think it will win you on first sight—on its looks, on its costly car attractions, on the way it acts.

There's plenty of "pepper" to its performance, plenty of speed, plenty of power, and plenty of snap to its "pick-up." There's more room now than ever before. The seat is larger, the body is bigger, there's more leg room.

Look among the high-priced cars, and you will find none which carries more modern features or better features.

Now Saxon Roadster has one of the finest and most efficient 2-unit starting and lighting systems that can be built. It is of the famous Wagner make. It also has demountable rims, and 30x3" tires.

Its motor is of the 4-cylinder, L-head, high-speed special Saxon design, built by the Continental Motor Company—the world's greatest makers of automobile motors.

It has a Reichenbach carburetor of the atomizer type, which represents the biggest advance in gasoline carburetion yet recorded—possesses five

distinct and definite advantages over any other carburetor built.

Saxon Roadster also has three-speed transmission. Among high quality cars this is the only type of transmission used.

Throughout the chassis it has the famous Hyatt quiet bearings—another costly car attraction. And the body is of stream line design.

The honeycomb radiator assures your motor of being kept cool.

Saxon Roadster has the Atwater-Kent ignition system—regarded as one of the best systems on the market. A new style body with Grecian rear bow adds to the attractiveness of this car's appearance.

In addition to these refinements there are such attractions as electric horn, tire carrier at rear, speedometer, ventilating windshield, adjustable pedals, Vanadium steel cantilever springs, and twenty more fine car developments.

The Saxon Roadster is \$495; Saxon "Six" Touring Car, \$865; Six Sedan, \$1250, f. o. b. Detroit. Canadian Prices—Six Cylinder Touring Car, \$1175; Touring Sedan, \$1675; Four-Cylinder Roadster, \$665.

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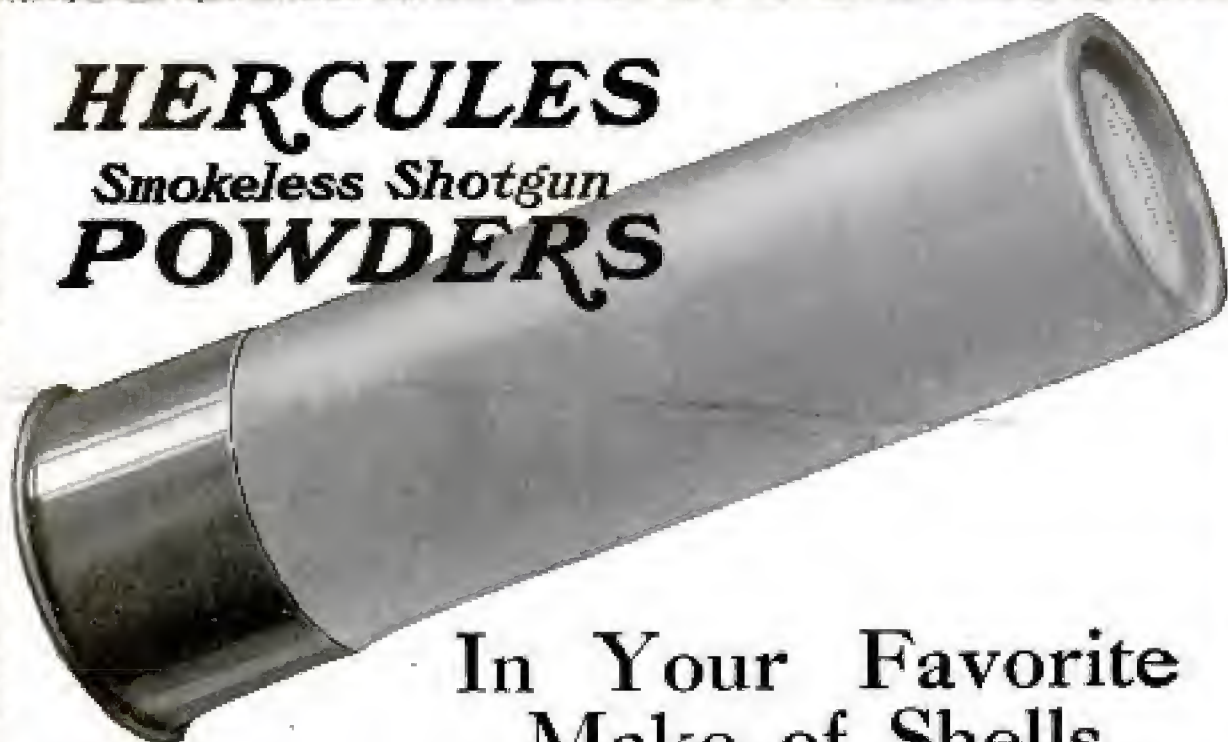
**SAXON MOTOR CAR CORPORATION, DETROIT**



# **HERCULES**

*Smokeless Shotgun*

# **POWDERS**



## **In Your Favorite Make of Shells**

Infallible and "E. C."  
can be obtained in all  
of the following makes  
of shotgun shells.

**PETERS**  
**REMINGTON**  
**SELBY**  
**U. S.**  
**WESTERN**  
**WINCHESTER**

**T**HE fact that you prefer some particular make of shell when shooting at the traps or in the field need not prevent you from enjoying the satisfaction given sportsmen by Hercules Smokeless Shotgun Powders, Infallible and "E. C."

These splendid powders, which are of high and remarkably uniform quality, may be obtained in any standard make of shell. Undoubtedly the shell you use is named in the list given at the left. The next time you order ask for a Hercules Powder in that particular make of shell. You will see the name of the powder stenciled on the box and on the top wad in each shell.

Hercules Smokeless Shotgun Powders give light recoil, high velocity, even patterns. You can't do better than shoot either Infallible or "E. C." Write for a free booklet that describes them fully.

**HERCULES POWDER CO.**

1025 Market Street

Wilmington



Delaware



# Enjoy the Great Outdoors



## The Bicycle Offers You the Only *Real Way* to Do It

**B**UNDLE up good and warm and then off for a brisk ride into the country, away from paved streets and city smoke, out where the air is snappy and invigorating.

No form of exercise that you can take will give you the real, keen enjoyment and at the same time do you the amount of good that you will receive from bicycle riding.

## Be Sure You Get a **MIAMI-MADE Bicycle**

Every piece of material that goes into those bicycles, every step in their manufacture, every part of their equipment is an expression of the purpose to produce the best bicycle that knowledge, skill, care, and experience could make possible.

**There Are Four Lines of MIAMI-MADE Bicycles**—the "HUDSON," the "RACYCLE," the "MIAMI," the "FLYING MERKEL." Each one of these lines has special features. See who the dealers are that handle these lines in your city. Try them all. Pick out the bicycle you like best. But be sure that it is MIAMI-MADE.

---

If there is no dealer in your city, write direct to us for one of our beautiful catalogs, checking which line you are interested in. **SENT FREE.**

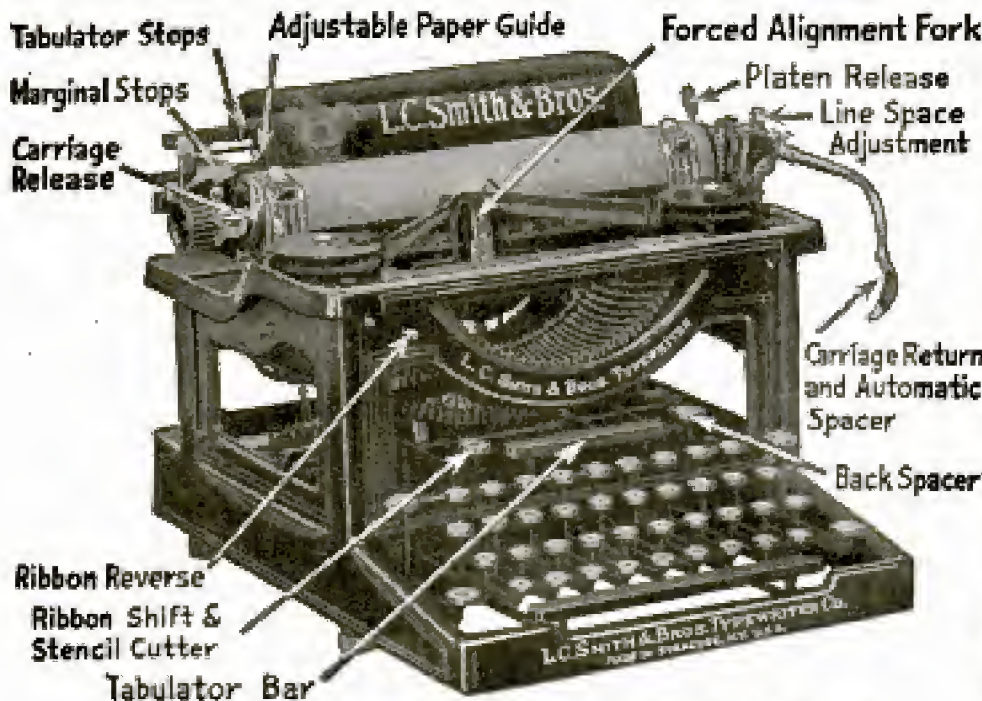
Hudson? \_\_\_\_\_ Miami? \_\_\_\_\_ Racycle? \_\_\_\_\_ Flying Merkel? \_\_\_\_\_

**THE MIAMI CYCLE & MANUFACTURING COMPANY**

1021-1037 Grand Avenue, Middletown, Ohio, U. S. A.

(11)





ALL LATEST IMPROVEMENTS

# TYPEWRITER SENSATION

Free TRIAL—Use As You Pay

Send me only \$2.50 a month until the low total price of \$48.80 is paid, and the machine is yours

This is absolutely the most generous typewriter offer ever made. Do not rent a machine when you can pay \$2.50 a month and own one. Think of it—Buying a \$100.00 machine for \$48.80. Cash price, \$45.45. Never before has anything like this been attempted.

**STANDARD L. C. SMITH**  
**VISIBLE**

Perfect machines, standard size, keyboard of standard universal arrangement—universally used in teaching the touch system. The entire line of writing completely visible at all times, has the inbuilt tabulator with billing devices, the two color ribbon—with automatic reverse and key controlled shift, automatic flexible paper feed—automatic paper fingers, the back spacer—ball bearing carriage action—ball bearing shift action—ball bearing type bars—in fact, every late style feature and modern operating convenience. Comes to you with everything complete, tools, cover, operating book and instructions, ribbon, practice paper—nothing extra to buy.

You cannot imagine the perfection of this beautiful reconstructed typewriter until you have seen it. I have sold several thousand of these perfect latest style L. C. Smith machines at this bargain price and every one of these thousands of satisfied customers had this beautiful, strictly up-to-date machine on five days' free trial before deciding to buy it. I will send it to you free of charge for five days' trial. It will sell itself, but if you are not satisfied that this is the greatest typewriter you ever saw, you can return it at my expense. You won't want to return it after you try it—you cannot equal this wonderful value anywhere.

**H. A. SMITH**  
Room 510-231 N. Fifth Ave.  
CHICAGO, ILL.

Ship me the L. C. Smith F. O. B. Chicago, as described in this advertisement. I will pay you the \$40.00 balance of the SPECIAL \$48.80 purchase price, at the rate of \$2.50 per month. The title to remain in you until fully paid for. It is understood that I have five days in which to examine and try the typewriter. If I choose not to keep it I will carefully repack it and return it to the express agent. It is understood that you give the standard guarantee for one year.

**You Take No Risk—Put In Your Order Now**

When the typewriter arrives deposit with the express agent \$8.80 and take the machine for five days' trial. If you are convinced that it is the best typewriter you ever saw, keep it and send me \$2.50 a month until my bargain price of \$48.80 is paid. If you don't want it, return it to the express agent, receive your \$8.80 and return the machine to me. I will pay the return express charges. This machine is guaranteed just as if you paid \$100.00 for it. It is standard. Over one hundred thousand people own and use these typewriters and think them the best ever manufactured.

The supply at this price is very limited, the price will probably be raised when my next advertisement appears, so don't delay. Fill in the coupon today—mail to me—the typewriter will be shipped promptly. There is no red tape, I employ no solicitors—no collectors—no chattel mortgage. It is simply understood that I retain title to the machine until the full \$48.80 is paid. You cannot lose. It is the greatest typewriter opportunity you will ever have. Do not send me one cent. Get the coupon in the mails today—sure.

**HARRY A. SMITH, 510-231 N. Fifth Ave., Chicago**

Name .....

Address .....

..... Pop. Mech. Feb.

I want, through this advertisement, to establish a friendly business relations with you as I possibly can. I want you to realize also that it is my earnest effort and intention to give you full honest value for every dollar that you spend with me. This is the only way I can succeed. My advertisement has appeared in this magazine continuously for more than four years.

I am building up my business on the foundation of good value and square dealings. I am saving thousands of dollars, by supplying perfect—late style—visible writing—typewriters, at remarkably low prices.

All my transactions are handled throughout by personal correspondence. I assure you every courtesy and consideration in your dealings with me. Your order will have my prompt, careful, personal attention. I will be glad to do business with you.

*Harry A. Smith*

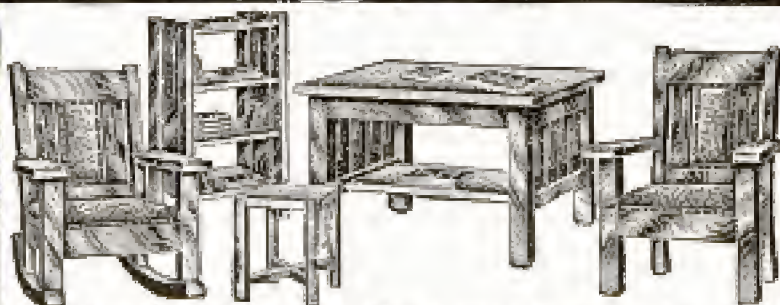


# 3 Wonderful Bargains

## From the Great UNIVERSAL Catalog

### — Each Sent Direct Only

# 50¢



### Special 5-Piece Mission Library Set

All five pieces made to match, of seasoned solid oak, fine rich fumed finish. Correct Mission design. Table is a neat design typical of mission style. The rich, dark fumed finish beautifully brings out natural grain of the oak. Each end has 4 panels with attractive cut-out design. Top 34x24 in.; 8 in. back shelf; legs cut from 2 in. stock and fitted with slides. Rocker: seat and back upholstered in imitation Spanish brown leather; seat supported by 6 heavy steel coil springs resting on steel channel bars. Width 25 in., height 45 in., back 25 in. above seat; seat 21x13 in. Chair has same upholstering and construction as rocker. Width 20 in., height 39 in., back 25 in. above seat; seat 21x19 in. Magazine Rack has 4 shelves; 30 in. high; 17 in. wide, 5 1/2 in. deep. Tabourette; top 12x11 in., height 18 in. Order by No. U123. Price, complete set of 5 pieces as shown \$17.95. Terms, 50c with order; balance \$1.75 per month.

# 50¢

### Sensational Sale High Grade Rockers

Announcement: massive, overstuffed Rocker, covered in luxurious imitation leather, choice of black or brown Spanish. 9 heavy coil springs support seat, attached to frame and reinforced by steel channel bars. Extreme height about 37 in. Extreme width about 34 in. Height of seat from floor 17 in. Distance between arms 21 inches. Size of seat 21x21 in. Height of back from seat 27 in. Molding Knit frame. Securely packed in a manner to obtain lowest possible freight rate. This is an exceptionally attractive Rocker, and as will be seen from the ample dimensions, a most comfortable one. It is substantial, built throughout, strong and durable.

Order by No. U124. Price Only \$9.68. Terms, 50c with order; balance 95c per month.

# 50¢



9 Heavy Coil Springs Support the Seat

### Special Kitchen Cabinet Bargain

This handy Kitchen Cabinet embodies many features that can add to the convenience and lighten the work of a housewife's kitchen duties. Made of kiln dried solid oak with beautiful gullion glass finish. Hardware is of copper, latest design. Height 63 in.; base top 42 1/2 in. Contains 1 cutlery drawer; 1 bread drawer; large cupboard space for cooking utensils; closet with door which contains rolling pin; and pan rack; one broad board 18x20 in.; portable 40-lb. flour bin with roller attached; unclipping closet with two panel and art glass doors; one 7-lb. tiling sugar bin; two spice drawers. Draw bottoms, back, etc., built of 3-ply non-warping lumber.

Order by No. U126. Price \$14.85. No money in advance — 50c with order — balance \$1.45 per month.

# 50¢



### Order One of These Special Bargains

Here is a plan for beautifying the home that marks the most advanced step ever taken in the history of merchandising. For only 50c we will send you any of the remarkable bargains shown on this page. If more than one is wanted send 50c for each item. You may use what you order for 30 days at our risk. If you then decide to keep it, pay the balance in small monthly payments. If you decide not to keep it return it at our expense and we will return your 50c—the 30 days use of the goods costs you nothing.

This small 50c deposit does not obligate you in any way, but is merely asked as an indication of good faith and to protect ourselves against irresponsible people ordering at random. You run absolutely no risk in sending in your order. There is a big, successful firm with over \$3,000,000 capital and resources—a firm that is reputable, responsible and trustworthy in every way. And every article you order from us is backed by our legal binding guarantee which insures your absolute satisfaction. Send us your order today—only 50c and coupon for each item desired.

### SPECIAL BOOK FREE

Send for Special Bargain Book picturing and describing everything for the home—at rock-bottom prices—and on the most wonderfully liberal terms imaginable. We will trust you for anything you want on our liberal, easy-to-pay, credit plan.

## UNIVERSAL MAIL ORDER CO.

145 W. 39th St.,  
Dept. 187  
Chicago



If only catalog is wanted put an X in this square, fill in name and address on lines below and mail coupon.

Universal Mail Order Co.  
145-153 W. 39th St., Dept. 187 Chicago

Gentlemen: Enclosed find 50c for each item checked below. If satisfactory after 30 days examination I agree to pay the balance as per prices and terms printed in this advertisement. If not satisfactory I will return goods to you.

☐ No. U123, 5-Piece Library Set

☐ No. U124, Rocker

☐ No. U126, Kitchen Cabinet

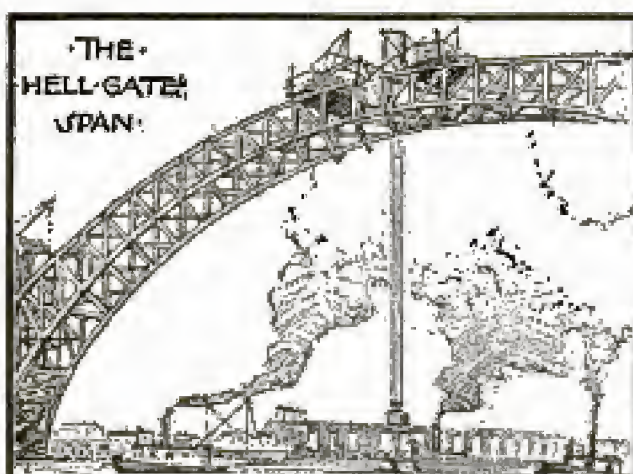
Name.....

Address.....

City..... State.....

Please Mention Popular Mechanics





### A Pencil Bridged the River First

A marvel of engineering and draftmanship was this great span. The details were tedious and necessarily correct. The success of the great span depended on the accuracy of the penciled drawings.

When you are designing intricate problems, you cannot afford to have your lead break, or crumble, or tear the paper. You cannot afford not to have the best pencil.

## DIXON'S ELDORADO

*"the master drawing pencil"*

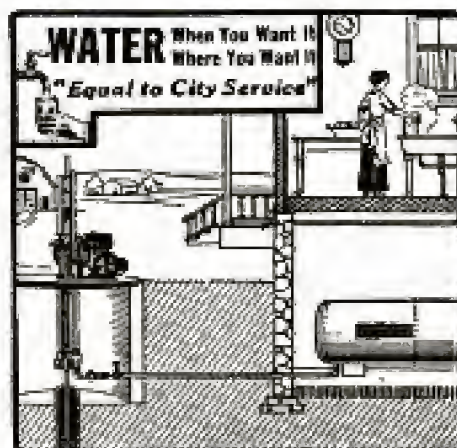
has received the highest endorsement of architects, engineers and draftsmen all over the country. It is the correct pencil for difficult work. Made in 17 degrees.

Send fourteen cents in stamps for samples worth double the money

**Joseph Dixon Crucible Co.**  
Dept. 10-J, Jersey City, N. J.

**DIXON'S BEST WHITE N° 352**  
*writes white on blueprints*

Please Mention Popular Mechanics



Water under pressure in your home will make housework easier, add to comfort, and increase the property value.

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## POWER

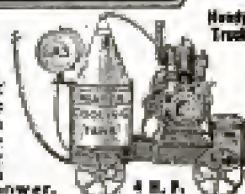
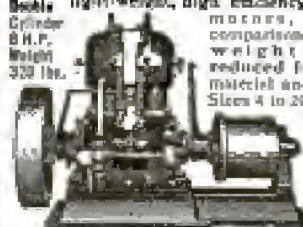


The two horse-power Benninghofen Engine offers even economical power for every purpose. Many new, exclusive features, including "auto-throttle governor" not hit and miss governed. Surprisingly low cost. Burns kerosene or gasoline. Runs machinery, pumps water, saws wood, runs separator, chum, etc. Catalogue and details free.

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Dept. 121 A HAMILTON, OHIO

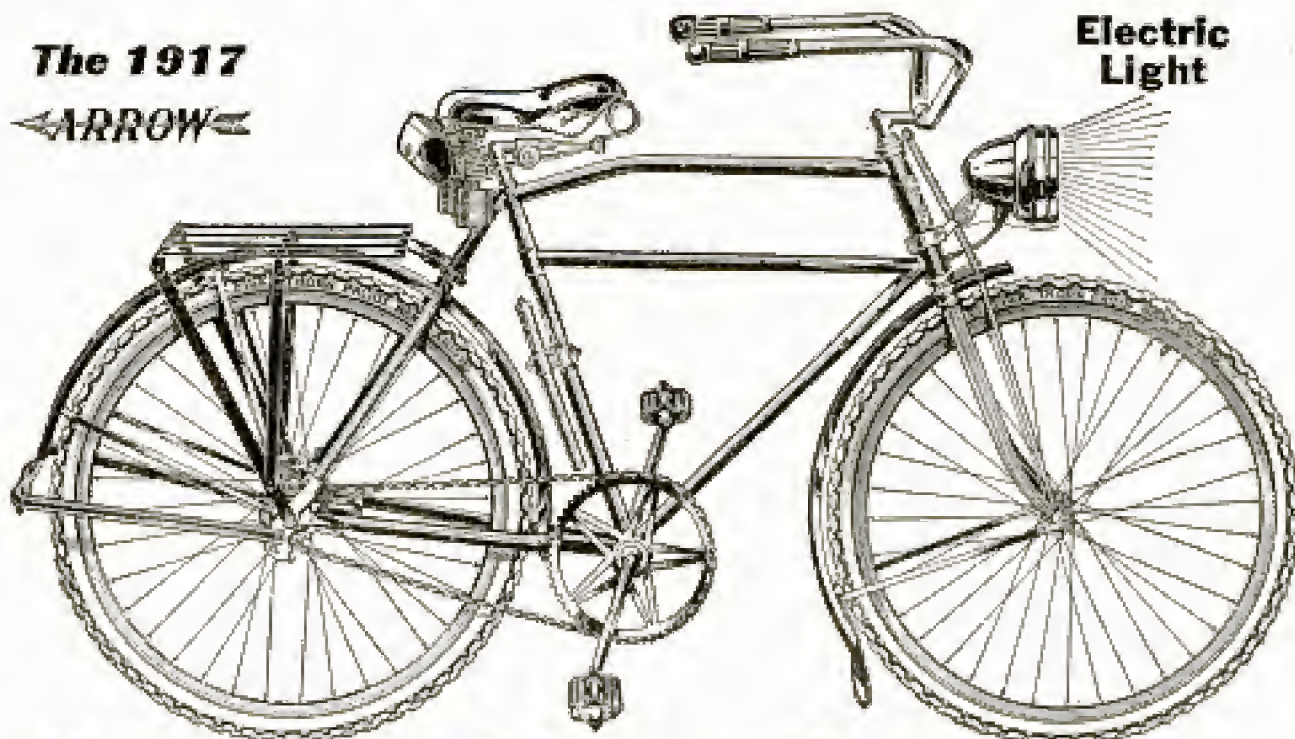
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**8 H.P. 2 Cylinder Only 320 lbs.**

Discussing light-weight motors recently, the Scientific American said: "Efficiency means light weight, reduced friction, and above everything else, lowered operating cost." Cushman light-weight engines are today recognized as the leading American built light-weight, high efficiency, all-purpose motors. Challenging comparison in maximum weight per horsepower, reduced friction, quality of material and workmanship and cost of operation. Sizes 4 to 20 H.P. Throttle Governor. Schlicher Carburetor. Forced Water Cooling System. Moving parts enclosed and run in bath of oil. Not cheap engines, but cheap in the long run. **ENGINE BOOK FREE.**



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## 1917 Features

### Electric Light

Reinforced motorcycle frame—large, easy motorcycle saddle—long, rubber grip, motorcycle handlebars. New Departure coaster Brake—special motorcycle pedals—motorcycle mudguards, stand and bag, gage carrier—imported anti-friction chain—Fisk ThernProof, Non-Skid Tires—beautiful enamel finish—other new features. Write now.

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Find out about our special, rock-bottom, direct offer on this new 1917 Arrow. A special, 30-day, reduced price offer. We ship the bicycle to you without a penny down. Start riding and enjoying the Arrow right away. And pay the special, rock-bottom, reduced price—a small amount each month—while you ride. Now, why should you even consider paying cash for a bicycle when you can get the wonderful 1917 model Arrow at the lowest, rock-bottom cash price and on small, easy monthly payments while you are riding it. Send the coupon now for new catalog.

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Just ride your Arrow around. People will admire your handsome bicycle and ask about it. Just answer their questions. You can pay for your Arrow and get extra money besides. Send the coupon for this liberal offer.

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19th St. & California Ave.

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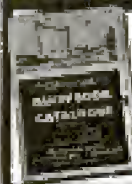
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common kerosene (test oil), no odor, smoke or noise, simple, clean, won't explode. Three million people already enjoying this powerful, white, steady light, nearest to sunlight. **Won Gold Medal at Panama Exposition.** Greatest invention of the age. Guaranteed.

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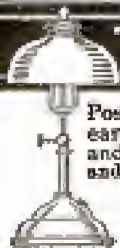
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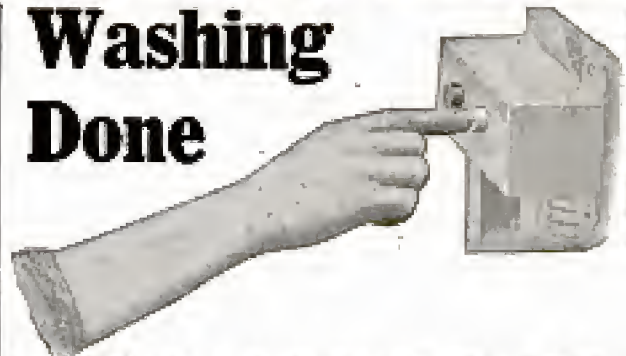
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These North Star Johnson Hockey or Racing Skates are used today by over 75 per cent of professional skaters in the United States. They are made of

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Thomas A. Edison

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The world's greatest inventor has made the music of the phonograph life-like, at last. Success—after years of labor on his favorite invention! Read our offer on his wonderful new phonograph.



Only **\$1.00** and after trial

An astounding offer—the New Edison, Mr. Edison's great new phonograph with the new Diamond Stylus reproducer and your choice of all the brand new Diamond Amberol Records will be sent to you on free trial without a penny down. The finest, the best that money can buy at very, very much less than the price at which imitations of the genuine Edison are offered—a rock-bottom offer direct from us.

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Edison Phonograph Distributors  
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Chicago, Ill.

Canadian Office:  
855 Portage Ave.  
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Manitoba.

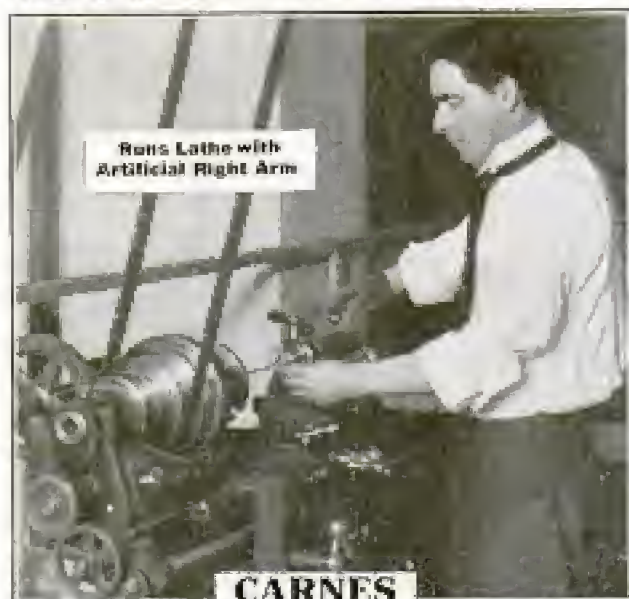
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PAT'D APRIL 6 1909

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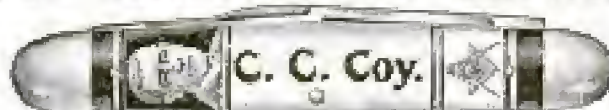
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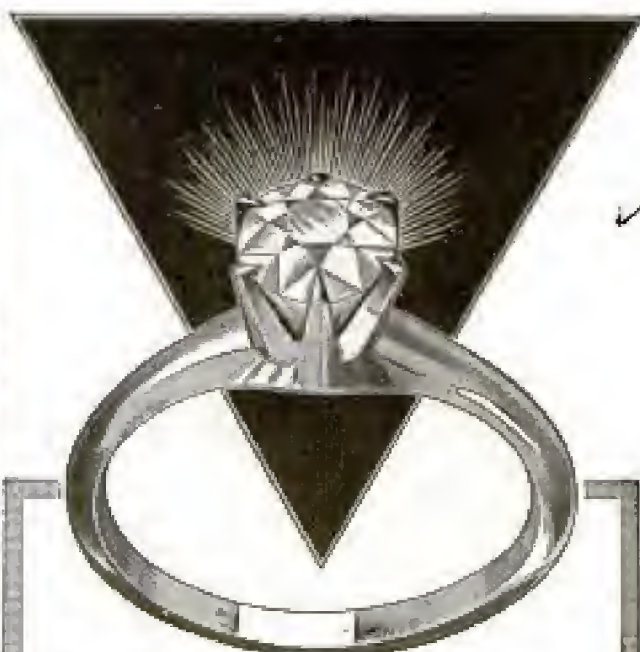
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Put your name and address in the coupon, or on a letter or post card now and get our new Diamond Book that tells the secret of Triangle Tested Diamonds. Find out how you are three times protected by the House of John A. Sterling & Son. The new Diamond Book—printed in full color—will be sent to you free and without obligation.

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Let us send this beautiful instrument to you on

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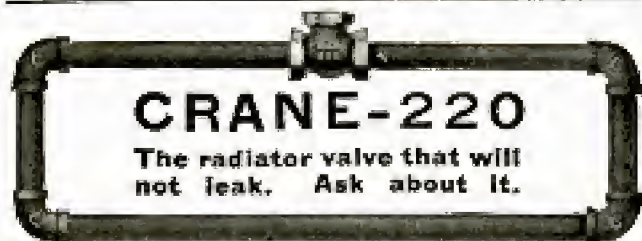
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GREEN AUTOMATIC MACHINE



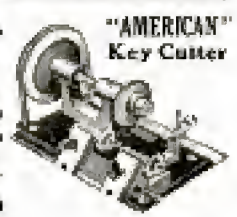
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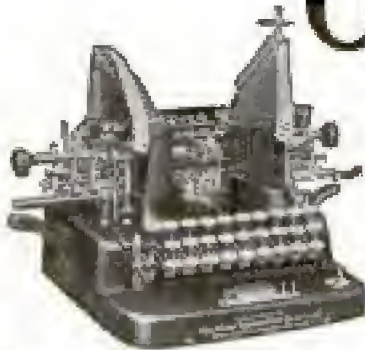
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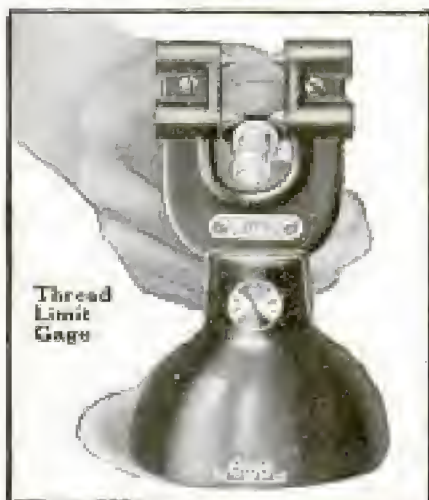
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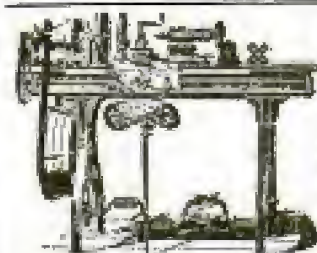
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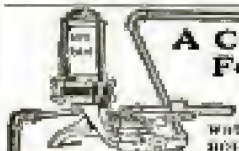


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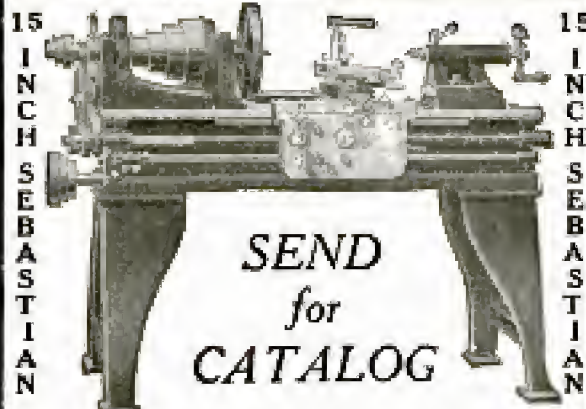
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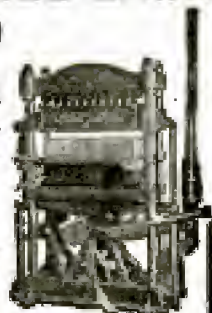
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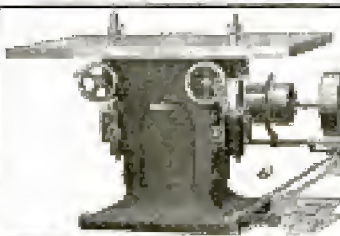
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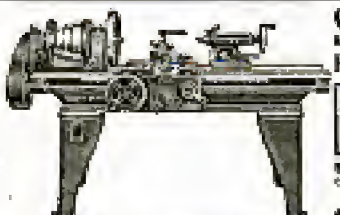
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## Most Powerful Nipper Made

1 lb. Handle Pressure = 20 lbs. Cutting Pressure

The strongest cutting plier made for its size. Cuts the toughest wires. Equal to any compound nipper. Polished head; scientifically shaped gun-metal handles fit the hand like a glove. This is just one of the styles of "RED DEVIL" Mechanic Tools.

Send 50c for sample "Red Devil" Diagonal Nipper, No. 542, 6 1/2 in. Send for descriptive matter on "Red Devil" Tools.

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**N**OTICE how carefully the measurement is taken and how interested the foreman is in the results. This job like many others in machine shop work calls for such fine limits that a mistake of one-half of a thousandth of an inch would ruin the piece. With reputation and job at stake you cannot afford to work with any but the most reliable tools.

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have had the confidence of three generations of mechanics. Fill your kit with these tools and you can do your work with a stronger feeling of surety in the accuracy of measurements taken. They will free your mind from worry and increase your efficiency as a skilled workman.

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FREE ON REQUEST*

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## Stanley Adjustable Try and Mitre Square No. 21

One of the handiest tools in a Carpenter's Kit. Especially useful for doing short work about windows, doors, etc., or in putting on butts or locks.

The Blade is adjustable and as it can be reversed, provides any size of try or mitre square within the capacity of the tool. In reversing, it is not necessary to remove the blade from the handle, consequently the tool is always assembled and ready for use.

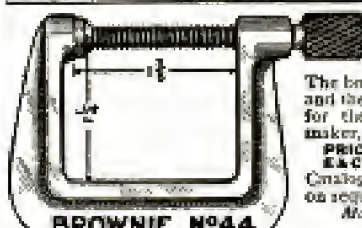
The locking device is such as to insure the blade being firmly and accurately secured at any point desired. The edges of the Blade are machined, graduated in 8ths, 16ths and 32nds of inches, and the tool is square inside and out.

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The body of clamps have steel blue finish, and the screws are die cut. Just the clamp for the handy man, machinist, pattern-maker, etc. Fully guaranteed.

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The greatest invention with which the unskilled man can repair leather goods or any heavy material. Needles and thread are inside the handle. **FAST SELLER.**

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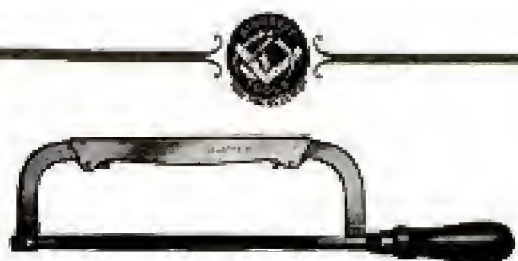
Keep your tools orderly arranged in a Gerstner Portable Tool Case. There's a place for every tool in one of the felt lined drawers. Every up-to-date mechanic needs one and you'll find our cases the best built, neatest and most practical on the market. We guarantee to please or refund all money. Write for our free booklet.

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Mfrs. of Mechanics' High Grade Tool Cases  
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In choosing hack-saws for hard use in the shop or for occasional use at home, you want the saw that cuts fastest and lasts longest. Long experience and great care in manufacture enable us to give you just the saw your work requires from the line of

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For every practical requirement we have a saw well suited to the work—cutting iron, steel or brass in the shape of castings, tubing, rolled shapes or sheet stock. Our hand frames give maximum convenience and service in your use of any blade.

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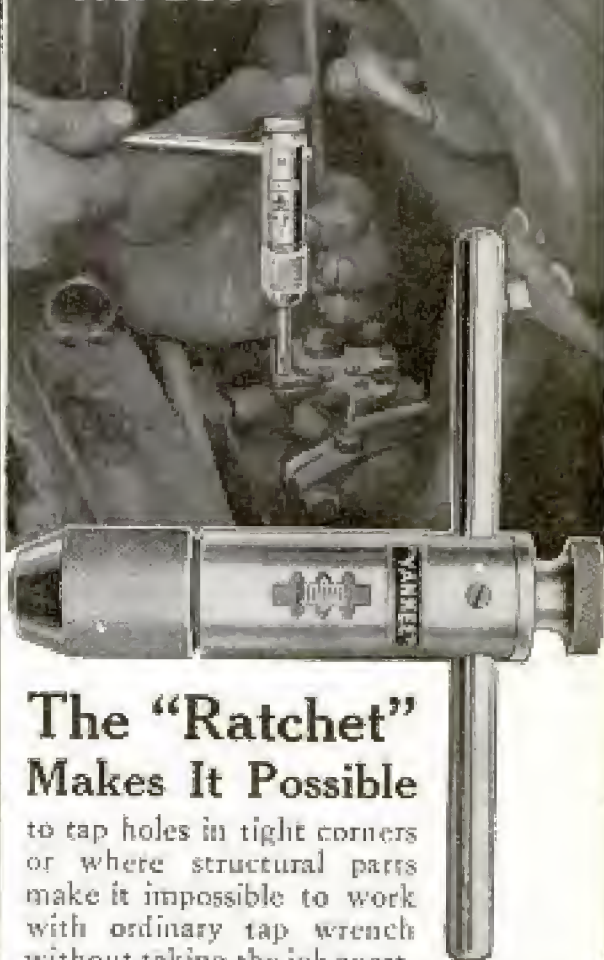
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**Athol, Mass.**



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## The "Ratchet" Makes It Possible

to tap holes in tight corners or where structural parts make it impossible to work with ordinary tap wrench without taking the job apart. Exceedingly useful when working about a car.

Three positions of Ratchet Shifter give Right and Left-hand movement or Rigid adjustment for inserting and removing taps. Cross bar is held securely in three positions or can be removed. Knurled thumb piece at top to start or back out taps quickly, has counter sunk center.

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Holds up to 3/16 in. taps. Diameter of chuck, 3/16 in. Length 3 1/2 in. Weight, 6 oz.

Price, \$1.25

Holds up to 1/4 in. taps. Diameter of chuck, 1/4 in. Length 5 in. Weight, 12 oz.

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Same as No. 251 in size, except slunk, which gives 13 in. reach. Wt., 1 lb. 1 oz.

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Sharp, eager-cutting, sure-of-stroke, it's the ablest co-worker the mechanic can have—the famous product of

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The real test of a wrench comes in starting a nut that has "rusted on"

In such an emergency the wise mechanic prefers a "Crescent" because he knows it will always stand the strain.

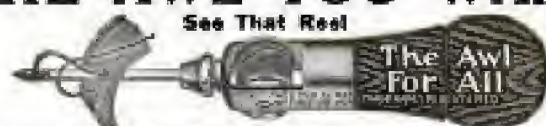
**We Guarantee Each Crescent Tool** to give satisfaction and will replace or refund the money on any tool which does not do so. The purchaser to be the judge.

## CRESCENT TOOL CO.

JAMESTOWN - N. Y.

**ORIGIN OF THE WORD HUMBUG**—It has been stated lately that "uimbog," an Irish word meaning soft metal, which was applied to a base and worthless coin, struck in the reign of King James II of England at the Dublin mint, is the real origin of the word "humbug." The coin, although having a face value of 20 shillings, was worth only twopence, and so it was not unusual to hear some one say: "That's a piece of uimbog (pronounced oombog); you can't pass it on me."

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Is the genuine MYERS \$1.00 "Look Fitch" Bowing Awl with the exclusive feature. See thread reel in front of handle under the finger tip. Natural tension. Saws heavy or light material, diamond point, full grooved needles used to protect the thread when sewing. C. A. MYERS COMPANY, 6339 University Ave., Chicago, Illinois

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**Liberal Proposition for Dealers and Agents**

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Twelve styles, felt lined drawers, solid brass trimmings, best of material, beautiful finish, low prices, satisfaction guaranteed. Ask for booklet of cases built for service.

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Compact, durable, perfectly designed. Keeps tools clean, safe, free from bangs, knocks and moisture. Saves time because tools can be so arranged that you only need open the drawer and pick out the tool wanted.

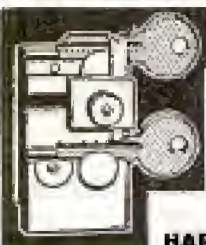
Made of plain or quartered oak or leatherette covered. Highly finished. Specially designed drawers, strong and perfectly lined, some with felt. Drawer pulls—specially designed, practical and efficient. Space saving finger-ring. Every chest guaranteed to give perfect satisfaction to users with your entire approval or money back.

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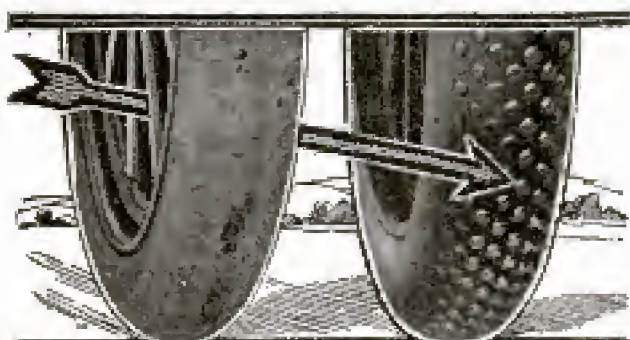
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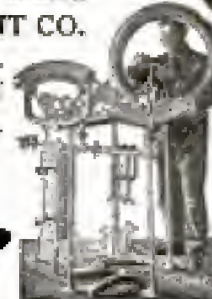
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**World's Lowest Priced \$100<sup>00</sup> Complete Motor Vehicle**

NOT a motor attachment for a bicycle, but a complete Motor Bicycle of special construction throughout. 1 1/4 h. p. four-cycle motor. Direct application of power through front wheel drive. No power lost as in chain or belt drive. Speed 25 miles per hour. High tension magneto ignition. Has three-stem rocker spring fork. Steel clincher rims with 2" extra heavy, corrugated-tread tires. Built in men's and ladies' models. Weighs only 125 lbs. Single grip control. Easy to ride and guide.

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There is a real opportunity open to one ambitious young man (or firm of young men) in each town where we are not now represented. If you are of a mechanical turn of mind, have a small amount of money, and realize that the only way to get to the top is to have a business of your own, we are ready to

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with the exclusive agency for the Dayton Motor Bicycle. No competition. No canvassing. No cut-prices. A bona-fide business opportunity for you—backed by a company with more than a million dollars' capital and 50 years' manufacturing experience.

Write for further details.

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five cigar and ash holders, were soldered to the edge, with the result that the made-over cases were sold at a greater profit than if they had passed in their original form.

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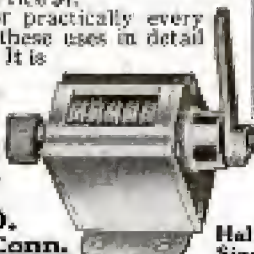
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**EVERYWHERE** the man of power—the healthy, vigorous, manly man—challenges admiration and respect. There is magnetism in his confident, self-reliant pose. The secret of perfect, vital health and power is not in the luck of birth. You can have it. Nature is striving all the time to make a manly, masterful man of you. And she needs only a little help to succeed. And you can give it to her. Vibration is the secret. It restores power to young men and old—the sparkling, glowing health of buxant youth. For vibration is life.

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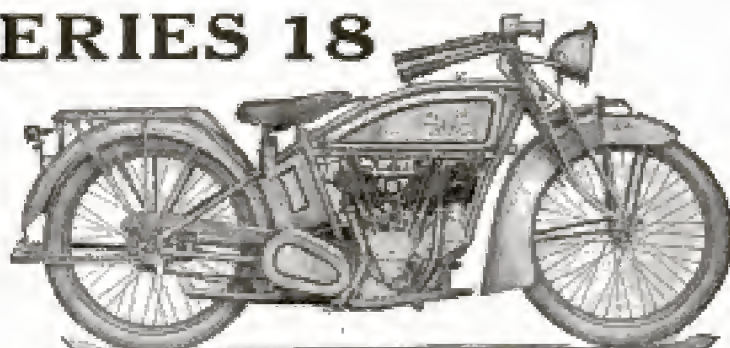
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Carry this little Pull-U-Out in your tool box and you will be independent of road conditions. With it a boy can, unaided, pull a 5000 lb. car out of ditch or mud. Pays for itself on its first job. Besides pulling autos out of trouble it will do all kinds of lifting and pulling in the factory, garage, on the farm or construction job, etc.

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Cheaper and better than a chain block. Does jobs no other machine can do.

WRITE FOR BOOKLET — VERY INTERESTING  
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Here's the plug you've wanted but couldn't get. It adds "pep" to motor and banishes trouble with soot and oil-pumping cylinders. Fires two separate and distinct sparks at the same time. If one clogs, the other goes right on firing and a few hot explosions cleans the fouled point.

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Tests under severest conditions show its superiority. You'll be surprised at its performance. Reduces carbon because the two hot sparks make a complete combustion. Buy a

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**Twin Fire Spark Plug Company**  
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**To Dealers:** We're a splendid proposition for you. Fastest selling plug on market—quick stock turn-over and liberal profits. Write or wire today for particulars.

Old style plugs are dead when sooted or oiled with oil.

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Two sisters from New York City who recently made a trip from their home to San Francisco on their Prest-O-Lite equipped motorcycles.

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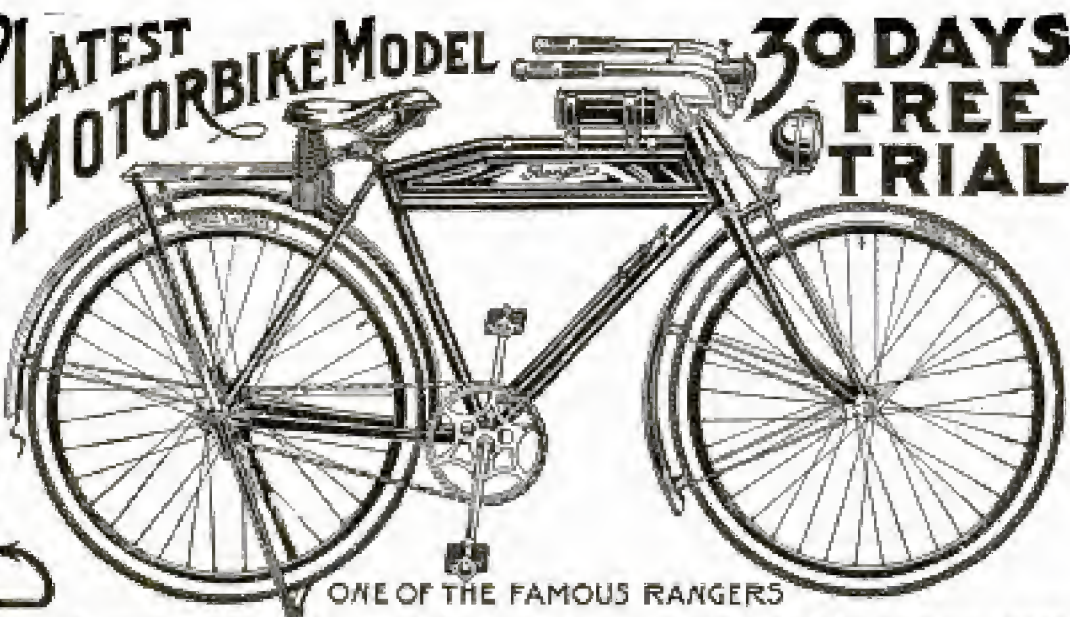
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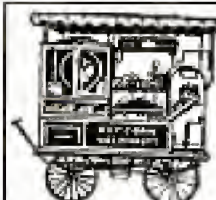
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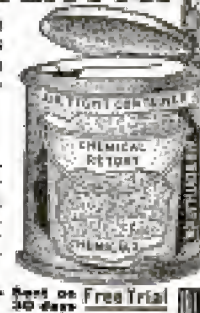
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(His application was filed March 25, 1916, and allowed April 10, 1916—sixteen days).

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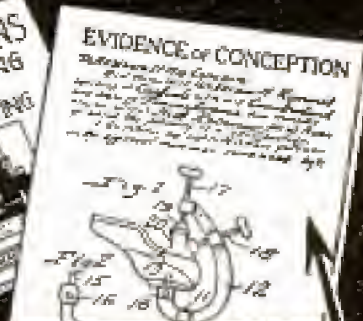
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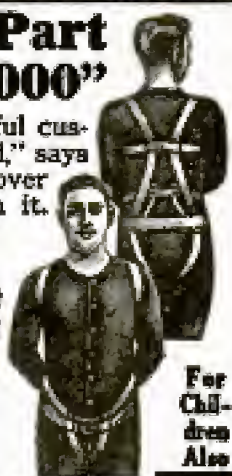
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If you're a slave of the tobacco habit and want to find a sure, quick way of quitting "for keeps" you owe it to yourself and to your family to mail the coupon below or send your name and address on a postal and receive our free booklet on the deadly effect of tobacco on the human system, and positive proof that Tobacco Redeemer will quickly free you from the habit.

**Newell Pharmacal Company**  
Dept. 300, St. Louis, Mo.



## Mail Coupon NOW for FREE Booklet

**NEWELL PHARMACAL CO.,**  
Dept. 300, St. Louis, Mo.

Please send, without obligating me in any way, your free booklet regarding the tobacco habit and proof that Tobacco Redeemer will positively free me from the tobacco habit.

Name

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# Make a Pal of the "Master 17"

Have you ever ridden a motorcycle? Did you ever get out in the morning when the dew was still glistening in the fields and meadows along the road? Have you ever heard the song of the Harley-Davidson motor and felt the tingle of the morning air as you sat in the saddle and watched the ever-changing panorama of green and brown flit by? If not, then you have not sounded the keynote of outdoor sports. Let the

## Harley-Davidson

be your pal. Then you can get out under the open sky where the air is filled with the scent of forest, field and stream; with only the sounds of snapping twigs, whispering leaves and rushing streams to break the silence—that is motor-

cycling. That is what it will mean to you to own a Harley-Davidson, for more than 15 years the "Master Motorcycle" and this year better than ever. Greater power, more speed, beautiful military olive drab finish—and perfect in design.

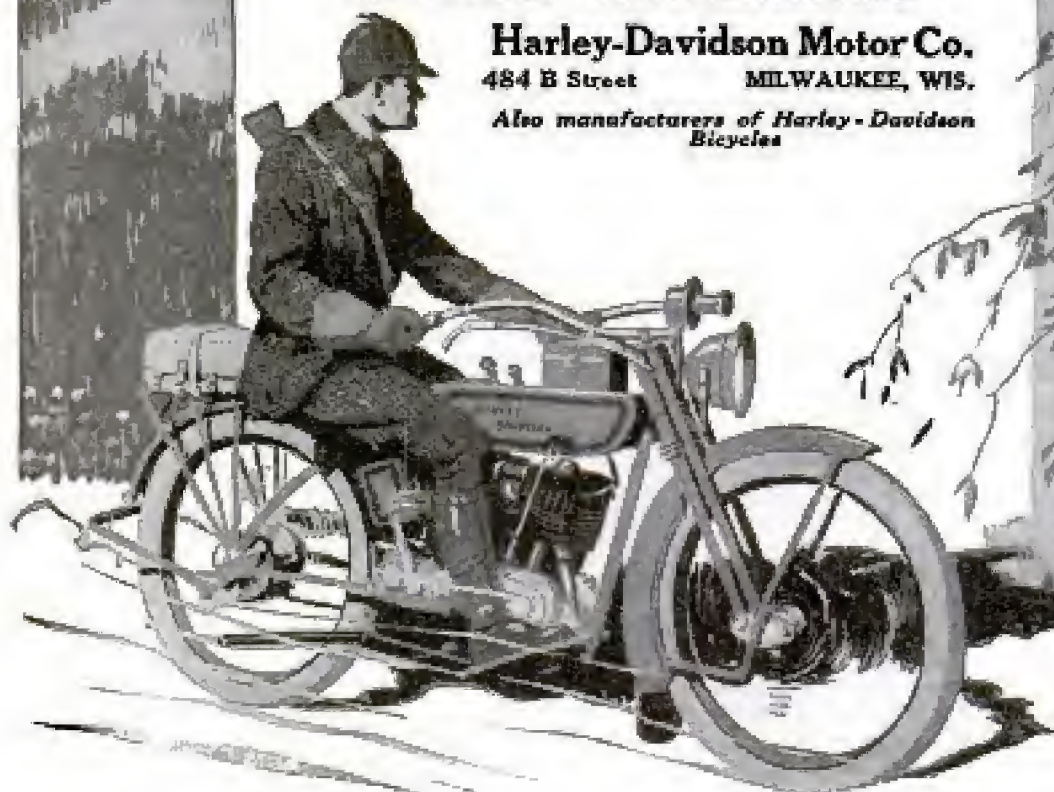
Any Harley-Davidson dealer will be glad to demonstrate for you and will probably make terms to suit your convenience. Write for illustrated catalog.

**Harley-Davidson Motor Co.**

484 E Street

MILWAUKEE, WIS.

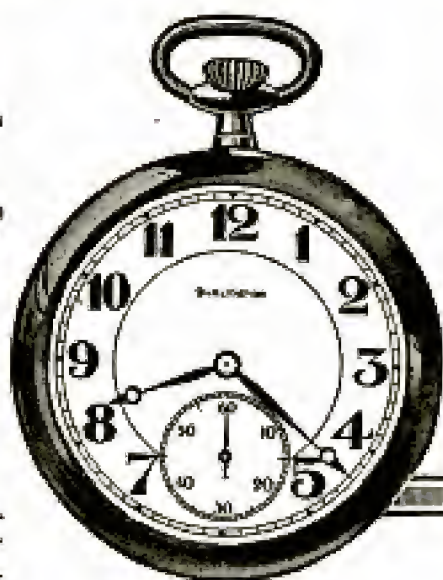
Also manufacturers of Harley-Davidson Bicycles



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# Special Introductory Offer!—



The new Burlington—just out—distributed now for the first time—and on an astounding offer. The superb new model far surpassing everything of the past. 21 jewels, adjusted to positions, temperature and isochronism. New thin design—and all the newest ideas in gold strata cases to choose from. Send coupon today for full particulars.

*And*—we will send you this master watch without a cent down. If you decide to buy it—you pay *only* the rock-bottom price—the same price that even wholesale jeweler must pay.

**\$2.50 a Month!**  
Just think of it!  
\$2.50 a month—less  
than ten cents a day

will pay, at the rock-bottom price, for the New 21-Jewel Burlington—the master watch. This perfect time-piece will be sent to you, prepaid, without a cent deposit so that you can see and examine it for yourself. When you hold it in your hand you will realize what a gigantic value it is—and you will know how the Burlington brought the highest watch value within the reach of all.

## 21 Jewels

—adjusted to positions  
—adjusted to temperature  
—adjusted to isochronism  
—adjusted to the second.

Runs almost 2 days in one winding.

On an Iron-clad guarantee.

## Newest

up-to-date ideas in gold strata cases—the master products of the goldsmith's art are illustrated in colors in our new Watch Book. All yours to choose from. Write for the new watch book now.

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Write today for our new catalog. Read about this gigantic watch value. Learn about watch movements and why 21 jewels are the number prescribed by watch experts. Read what makes a watch movement perfect—and how the Burlington is adjusted to to the second. The watch book is free. Write for it today and get posted on watches and watch values. Send the coupon.

**Burlington Watch Co.** Dept. 1192, 19th St. & Marshall Blvd., Chicago

Burlington Watch Co.  
19th St. and Marshall Blvd.  
Dept. 1192 Chicago, Ill.

Please send me, without obligation (and prepaid), your free book on watches, with full explanation of your each or \$2.50 a month offer on the Burlington Watch.

Name.....

Address.....

Last chance at old prices—date prices go up will be announced—write at once for catalog.



**BERNARD-HEWITT & CO.,**  
Desk F22, 564 W. Monroe St.,  
CHICAGO, ILL.

Please send me your new Spring style book with 70 samples free — also full details of your special lining offer.

Name .....

Address .....



**MAIL COUPON**

For Spring and Summer  
**STYLE BOOK**

**70 SAMPLES FREE**

## Handsome \$25 Blue Serge Suit Made to Measure only **\$15**

A SPECIAL proposition to introduce the wonderful values offered by our system of tailoring. We have no agents — no dealers — no traveling salesmen — our values make their own customers — and once a Bernard-Hewitt customer always a Bernard-Hewitt customer. That's why, to secure your first order, we are willing to make to your individual measure, a handsome, all pure wool worsted blue serge suit (usual \$25 value) for only \$15 and line it with a

**WE PAY  
SHIPPING  
CHARGES**

### **\$4 SATIN LINING FREE**

Remember this suit is made to your individual measure from the very finest all wool blue, light blue, black or gray serge, in the latest approved Chicago style, and by the very best tailors in this whole city.

But perhaps you don't care for a serge suit. Well, our big book which we will send you free contains generous samples of the latest fabrics; plain and fancy mixtures, the up-to-the-minute offering of leading woolen mills.

The \$4.00 Satin Lining free offer goes no matter what selection you make — and we pay all shipping charges. We take all the risk — you none — for this is



### **OUR GUARANTEE** You Don't Pay Us One Cent

Unless you are more than pleased in every particular in fit — in style — in workmanship and in materials. Could anything be fairer? Write today — wear real tailor-made clothes — dress better and save money.

**Take Your Own \$10 Measure—Save \$10**

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Our big new Spring and Summer book is ready for you — contains 70 samples latest woollens — also lowest prices on men's hats, shoes and furnishings. It is your guide to correct and economical clothes buying. Mail coupon above or send post card for your copy. Please mention POPULAR MECHANICS so that we can identify this special offer.

## **BERNARD-HEWITT & COMPANY**

564 West Monroe Street

Desk F22

CHICAGO, ILLINOIS





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## On This Home

It was built on the Sterling System by a man in New York—(name sent on request.) He says it would have cost \$450 more if built in the ordinary way. All the waste of hand sawing, all the costly mistakes, all unused material, all the "extras" were eliminated. He got his material ready cut, all in shape to erect at once. His price was met. He paid only for what was actually used. He saved on labor also. And he has a fine modern home. Get the facts about the Sterling System by sending the coupon below

# Sterling System of Home Building

The Sterling Ready Cut System of home building is the modern way—the way that saves you money on material and on labor and saves your time. The system that gives you the best designs of the ablest architects without extra cost. Do not build until you see what a big saving you can make by the Sterling System. Compare the Sterling System, which saves the material to exactness with automatic machines with the old hand saw method with all its mistakes (paid for by you). Get the facts. Then decide. We will gladly tell you all about this modern way of building. Let people who have bought Sterling homes tell you of the savings they made. (Names and addresses furnished on request.) Get this information without fail before you contract for a home. Also learn how we extend credit, if you want it. Send the coupon now.

# Book of 50 Plans for Homes

With Complete Pictures—10c

**Mail the Coupon**



This book tells the whole story. It explains how you get the best selected material and pay for only what is actually used in the building. It also shows how you save dealers' and lumber brokers' profits in addition to the saving you make in actual material and time. A real guide to home building. No matter what style of home you build you need it. Send the coupon and enclose ten cents for postage and wrapping.

**International Mill & Timber Company**  
Dept. 1192 BAY CITY, MICH.

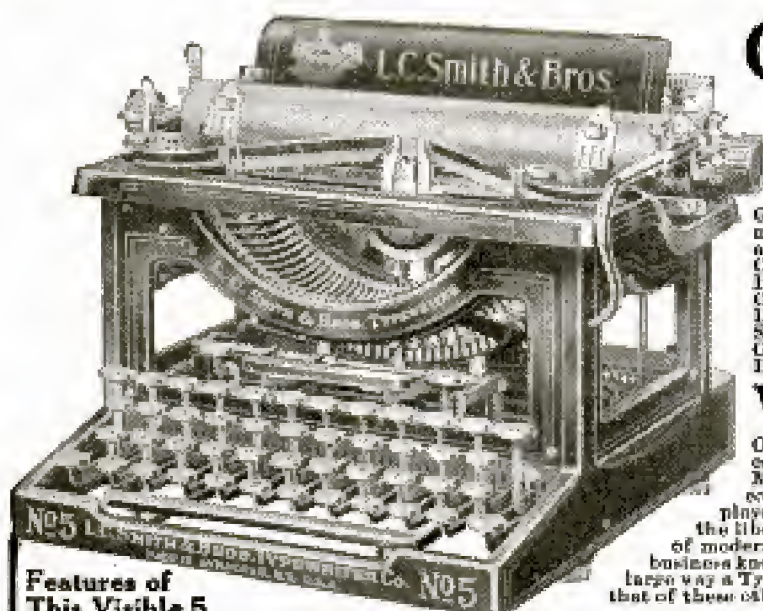
International Mill  
& Timber Company  
Dept. 1192, Bay City, Mich.

I want all the information I  
can get on building especially  
if it will save me money.  
Send your book. I enclose 10c  
for postage and wrapping.

Name.....

Address.....





### Features of This Visible 5

Includes—Ball bearing throughout. Typewriter segment shift, rigid carriage. Automatic ribbon adjustment, flexible paper feed, lighting mechanism, electric key touch. Tabulat and biller, marginal release key. Automatic paper fingers.

### 30 Days' Trial—Easy Payments—Save \$36

You are to be the sole judge of the merits of this Model 5. Write on it 30 days. If you are not convinced of its great worth, return it at our expense. The trial will have been at our expense, not yours. Our terms permit small monthly payments. Finally, we will show you a decided saving of \$36. Surely you are now interested enough to send the coupon today for all the details of our introductory offer. **DO IT NOW.**

**Larkin Co. Desk TPM-217, Buffalo, N. Y.**

Please tell me all about the Model 5 L. C. Smith Typewriters and quote the "special" introductory Factory-to-Family price.

Name .....

Address .....

## Great Institutions Use This Typewriter

Therefore you are safe when you use this same Model 5 L. C. Smith Visible Typewriter which serves of this country's greatest institutions, from the United States Government down, see to the number of many thousand machines. Some of the many great users of this Model 5 are Acme White Lead & Color Co., Curtis Publishing Co., Du Pont Powder Co., Firestone Tire & Rubber Co., International Harvester Co., Kellogg Toasted Corn Flake Co., National Biscuit Co., National Surety Co., Parke Davis & Co., Sears Roebuck Co., Sherwin Williams Co., Solway Process Co., A. G. Spaulding & Bros., Standard Oil Co., Swift & Co., Washburn Crosby Co., Westinghouse Interests and six of our greatest railroad systems.

## We Use 500 Model 5's

Our own great business, serving two million customers the celebrated Larkin Factory-to-Family way, requires 500 Model 5's to answer our customers' letters. No one would contend for a moment that our own experts or those employed by other large users of Model 5's could be mistaken in the liberal use of this Typewriter in meeting the complex needs of modern business. Business has no place in such decisions. Big business knows the merits of all Typewriters before it adopts in this large way a Typewriter as it has Model 5. Profit by one experience and that of these other well known users and possessors a Model 5.

## Get the Introductory Price On Model 5 L. C. Smith Typewriters

Just now in assisting L. C. Smith & Bros. Co. in distributing the Factory-to-Family way these factory-rebuilt Model 5's we are quoting in early buyers a "special" introductory Factory-to-Family price. Knowing the Model 5 as we do from having used it in our own offices for many years, we are certain that Model 5's bought at this "special" price will help us sell many more of the same model to friends of the first purchasers. We know of no Typewriter now on the market which offers such a bargain value as does our offer on this genuine, fully guaranteed factory-rebuilt Model 5. You'll do well to ask now for our introductory offer.

### 100 New 5's Made Each Day

This Model 5 we now distribute direct from the factory to the user, is a correct up-to-date, modern, fully improved Typewriter. There is no obsolete, discarded model otherwise, do you think for a moment that we would conduct our own heavy correspondence with other than the best these makers produce. We have only to state that L. C. Smith & Bros. Co. are makers over 100 new Model 5's each day to assure you that this is indeed a modern-to-the-minute Typewriter. **SPECIAL—Model 5's at \$45.30**

**5**  
shown  
above  
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## AGENTS—Make \$100 to \$300



per month easy selling our new TriPLICATE Sauce Pan. Cooking utensil for 3 different foods on one burner. 400 Specialties—all whirlwind sellers. Write quick for exclusive territory and large catalogue. **AMERICAN ALUMINUM MFG. CO.** Div. H-T LEMONT, ILL.

**SUPERIOR SINCE 1904**

### Over 100,000 in Use

Mostly sold through recommendations. For PERSONAL DESK or GENERAL OFFICE. It checks mental calculations. Buy through your Stationer. Write for 10-day trial offer.

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## MAKE ANY RANGE A GAS STOVE

Wonderful new device—fits any range or heating stove—burns coal oil like gas. Safe, clean, odorless. Stop carrying coal and ashes. Free literature. Agents wanted.

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## BLUE-JAY CORN PLASTERS END CORNS IN 48 HOURS

A million corns monthly disappear under Blue-Jay. Your own friends employ it. Countless people around you—users of Blue-Jay—never let a corn ache twice. 15 and 25 cents at Drugists. Also Blue-Jay Bunion Plaster. **BAUER & BLACK, Chicago and New York**

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### 4-LB. FIBRE LEGS—ON EASY TERMS

Orthopedic braces for all deformities. Send for booklet. **MINNEAPOLIS ARTIFICIAL LIMB CO., 638 Dear Rd., MINNEAPOLIS, MINN.**



## I WANT 200 SALES AGENTS AT \$1200 TO \$3600 A YEAR

To introduce my new Compress and Vacuum Washing Machine to every home in the country, I want 200 additional representatives to begin work at once in their home countries. I consider this machine the most brilliant inventive achievement of the age in household necessities. It is selling faster than anything I have ever heard of—going like wildfire.

## PROFITS START FIRST DAY

No waiting or guessing. The price of only \$1.50 makes a sale at every house—cash business at 200 per cent profit to you. The biggest opportunity ever offered. I want hustlers—men and women who want to make money quick and fast. No large investment needed—business supplies the capital.

**NO EXPERIENCE REQUIRED** Just follow instructions. Success assured. Frank (Grove) sold 45 first three days—profit \$45. Mrs. L. O. Marick made \$90 first three weeks in spare time only. J. H. Goddard took 18 orders first three hours. No talking necessary. Just show it—the order is yours right on the spot.

**H. F. WENDELL, Pres., Wendell Vacuum Washer Co., 1158 Oak St., Leipsic, Ohio**



**\$1.50**  
Selling  
Price

Every machine sold on money-back guarantee. A child can use it. Abolishes labor of wash day. Women discard \$15 and \$20 machines for it.

### MAIL YOUR APPLICATION TODAY

Don't delay. Get your creamy order contract. No charge for territory. To wait means to lose. Write me a letter or a postal card today. If you are honest and willing to work I will give you the position. Do not let someone else get in ahead of you. I want agents, general agents and managers. Write today—then you will have done your part. Do it right now. Address





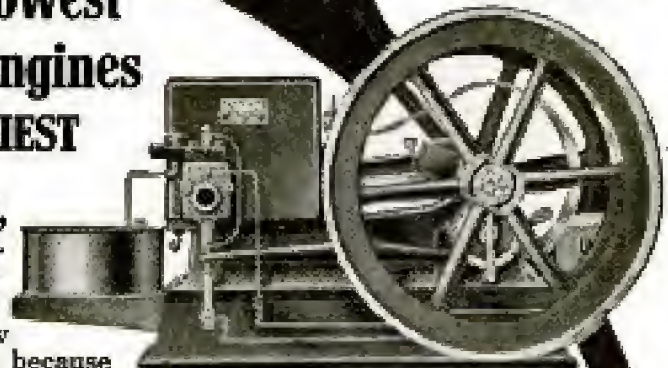
I own and operate the largest exclusive engine factory in the world selling direct to user.

ED. H. WITTE.

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**My Prices are Lowest  
On High-Grade Engines  
My Terms are EASIEST**

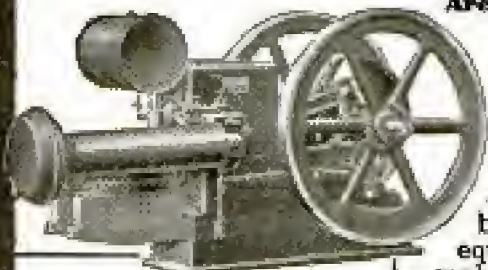
**GASOLINE ENGINES  
2 to 22 H.P.**



I save you \$25 to \$100, considering WITTE Engine construction. I save you weeks of waiting when you want an engine quick. I save you the trouble of "trying out" engines you know nothing about. I save you future trouble, because my past record of 30 years selling only high-grade engines is a guarantee in itself, that I will make good to you and to every buyer. I save you putting off buying by having four plans of purchase—Cash—Easy Payments—Bank Deposit or No Money Down, letting the engine you select earn its own cost.

## WITTE HIGH-GRADE ENGINES

Are Built to Operate on Kerosene, Gasoline, Naphtha, Distillate Oils, Natural or Artificial Gas.



**KEROSENE ENGINES  
2 to 22 H.P.**

My engines are exclusive in design, different than any other engine sold direct, easy to understand and operate, and proven doubly desirable through 30 years of selling reliable engines for farm and shop power. I make nothing but engines—give you 100 per cent efficiency in engine building. I

buy everything for cash. My factory equipment includes the finest engine making machinery obtainable, especially selected to reduce manufacturing cost. You take no more chance in buying an engine from me than in taking your money from one bank to another. The WITTE 4-Year Signed Guarantee has a million dollar factory back of it, and the factory has a definite future before it. Furthermore, if you want an engine **at once**,

**BUY  
ON YOUR  
OWN  
TERMS**

### Write To WITTE

I can ship immediately—any size or style. Kerosene or Gasoline, Stationary or Portable. Don't make any mistake on the engine you choose, or the price you pay. Get my prices and terms. Try a WITTE 30 days. Learn just what a WITTE high-grade engine will do, and why the WITTE is better on account of better factory equipment, better workmanship, better materials, and sold on better terms.

Read my Free Book, "How To Judge Engines," which fully explains why and how I save you \$25 to \$100.—ED. H. WITTE.

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1746 Oakland Ave., Kansas City, Mo.  
1746 Empire Bldg., Pittsburgh, Pa.

Please send me your Free Book,  
"How To Judge Engines."

Name .....

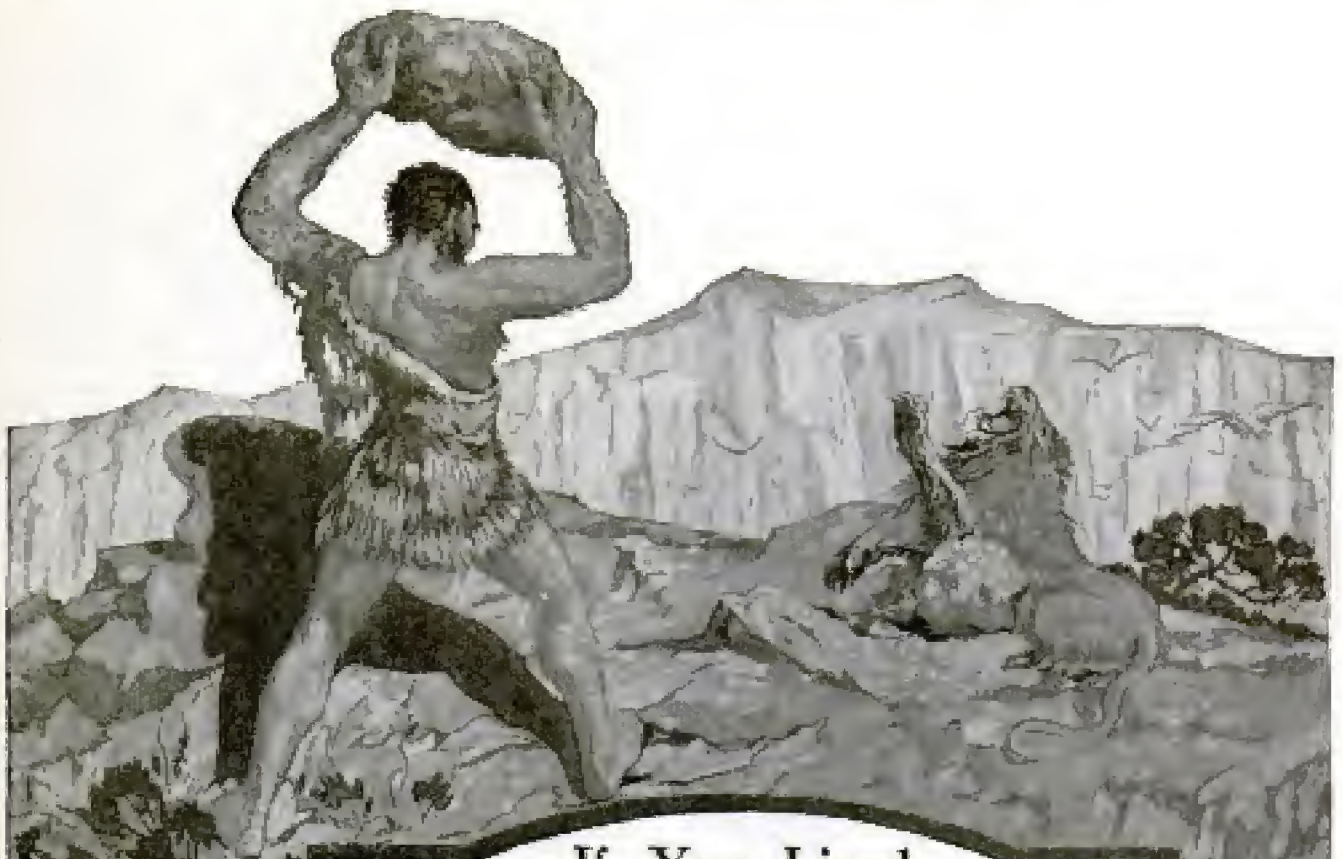
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## If You Lived As The Cave Man Lived

*Your health would take care of itself.*

The cave man ate coarse food and lived a strenuous life in the open. His digestive apparatus was suited to that kind of an existence.

You inherit from the cave man the same internal mechanism, *but you eat different food and you lead a different kind of a life.*

Hence the almost universal prevalence of constipation and its constant menace to health.

Your problem is to adjust that "cave man" internal mechanism of yours to the sedentary life and concentrated food of civilized man. NUJOL accomplishes this adjustment by preventing the bowel contents from becoming hard, thus making natural movements easy. It doesn't upset the ordinary processes of digestion and it doesn't form a habit.

NUJOL is sold in pint bottles only, at all drug stores. Refuse substitutes—look for the name NUJOL on the bottle and package.

Dept. 68

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Send for booklet, "THE RATIONAL TREATMENT OF CONSTIPATION." Write your name and address plainly on the margin below.

*Please Mention Popular Mechanics*





# Genuine, New All-Wool Serge

Made - **\$15**  
to-Order **50**  
For Only **=**

**G**LENN Urquart Plaids—Tartan Plaids, Shepherd Plaids, Fancy and Pencil Stripes, Two tone stripes. Your choice of any cloth, plain or fancy weaves, rough mill finish or smooth finish—tailored to your own measure at prices that will astound you.

## Guaranteed All Wool!

There is not a cotton thread in any of our fabrics. We guarantee it. Nothing but pure wool and pure silk goes into the fabrics from which Babson suits are made.

Send the coupon for our Spring Style Book and read of the remarkable bargains in tailored-to-measure clothing. The newest fabrics—at prices never equaled by any other high-grade house. The All-Wool Serge is but one of the bargains we offer. Just think of it! A genuine All-Wool Serge—made to your measure for only \$15.00.

## On Credit!

Don't decide to buy until you have seen the suit for yourself. Note the perfect fit—note how carefully it is made in the latest style—compare it with any other suit you ever bought—then, if you are not satisfied, send it back.

And, while you buy at the direct bargain prices, we also give you time on your payments. (Just as local dealers in your town give their best customers.) Your credit is good with us.

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The Spring Style Book is ready. Send the coupon—or a letter or a post card and we'll send the new

Spring Style Book absolutely free. It is handsomely printed in full colors and shows the latest New York styles. With the book comes large generous samples of the all-wool fabrics from which you have to choose. It's just like having a tailor call at your home to get our Spring Style Book. Write for it today. You will be under no obligations.

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For free colored Style Book and 44 large samples of the real cloth for suits and overcoats. We can have your suit ready in 10 days. Send for booklet and free imported samples.

**Babson Bros.** Dept. 1192 19th Street Chicago

**Babson Bros.**  
Dept. 1192 Chicago

GENTLEMEN: Please send me your free colored Style Book and 44 large cloth samples of real cloth for suits and overcoats. Also explain your easy credit terms.

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## NATIONAL Gets Big Hatches

Peter Kilpatrick, Nazareth, Pa., writes, "Have made better hatches than anyone here."

### Money cannot buy greater hatching value

Hot water heat—double wall—dead air space—asbestos lining—self regulating—ventilating—double glass doors—safety lamp—egg tester. No extras to buy—easy to operate—will not warp or shrink. Strongest, most durable incubator made.



**40 DAYS' TRIAL**  
**12 Years' Guarantee**

**165 Egg Incubator**

**Only \$10**

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Take no chances. The National is built on U.S. Government specifications. A proven cold weather hatcher. The World's Greatest Incubator Bargain. Send postal today for Free 1917 Catalog and Poultry Book—worth dollars to every poultry raiser—or order direct from this ad and save time. Incubator and brooder both prepaid \$12.50. Comes set up ready to run, with book of instructions. You take no risk, satisfaction guaranteed or money refunded. Don't delay. SEND FOR POULTRY BOOK TODAY SURE.

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## New Kind of Incubator

Wonderful new hatching machine discovered. Poultry profits doubled and tripled. Three-fifths the work, time and money saved. All the money cut out.

### Radio-Round Incubator

Built ROUND—nature's way—like the hen's nest. NO COLD CORNERS. Triple heating system, wonderful new regulator, COMPLETE CIRCUIT radiators, patented heat diffuser MEAN EVEN HEAT all through egg chamber, and only one gallon of oil as a fuel. Radio Vaporizing Moisture Attachment BUILT IN, automatically supplies JUST ENOUGH moisture always. Big oil tank filled ONLY ONCE for entire hatch. Time saving egg tray; hinged cover with glass panel. Send postal today for free new FREE book which describes in detail the 30 wonderful features of the Radio-Round.

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WRITE  
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## \$5 Starts You Raising Poultry

The wonder of the poultry world. A neat, all-steel, mechanically correct incubator. Fifty egg capacity—hatches as large a percentage of eggs as any high priced machine.

### BABY GRAND INCUBATOR

Is built with the same care as our world-famous Old Reliable. Has double top, thoroughly insulated, double walls, positive heat and moisture regulation, perfect ventilation. Sent ready to start, by parcel post or express, charged post, on receipt of \$5 cash, check or money order. This machine will surely satisfy you. Requires little attention. Write for it today. Write for big illustrated catalog.

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Send Johnson your name and get the bedrock facts on making profits with chickens. Learn how Johnson started 700,000 people the simplest and easiest way with

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Big production makes low price. And Johnson pays freight. Quick shipment—made arrival guaranteed. Write at once for new book, whether you start now or not. Address

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## Get 85 Per Cent Hatches!

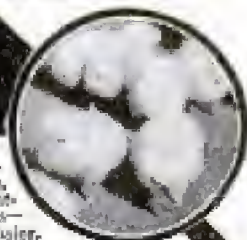
"We get an 85% hatch every time with our X-Ray Incubator."—Mrs. C. D. McCracken, Greensboro, 1917 model great set yet. 5 New 1917 Features—each makes greater hatches easier.

### LEARN all about X-Ray Incubator

—the famous hatcher that takes only one gallon oil—one filling—for entire hatch. X-Ray Duplex Central Heating Plant—directly underneath—the secret of 90 phenomenal success.

Express prepaid to practically all parts. Send for 1917 Catalog No. 82—**X-RAY INCUBATOR CO.**  
Box 82, Des Moines, Iowa

**Get the Free Book**



## DON'T KILL or SELL YOUR LAYING HENS

The Potter System is the greatest discovery of the century. It tells you how to pick the "Layers" from the loafers or diseased hens. Used by over 50,000 poultrymen. Simple and certain. Save food and build up a flock of all layers. New 100 page Potter System Book explains it. Circular free.

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of fine bred poultry for 1917; 67 breeds illustrated and described; information on poultry, how to make hens lay, grow chicks—all free. Low price on stock and hatching eggs. Incubators and brooders, 25 cents in business. This book only 10 cts. Sent today.

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and Almanac for 1917 has many colored plates of fowls true to life. It tells all about chickens, their prices, their care, diseases and remedies. All about incubators, their prices and their operation. All about poultry houses and how to build them. It's an encyclopedia of chickenhood. You need it. ONLY 10c.

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## Large Profits From POULTRY

can be made when you thoroughly understand practical poultry culture and know the proper way to select, rear, house, feed and make your birds. In our course of 48 complete lessons, Fred Quisenberry teaches you how to make a good profit from a flock of hens properly cared for.

**Our Free Illustrated Book—"Dollars and Sense in the Poultry Business,"** tells you how to make money in the poultry business. It leaves nothing to chance or guess work. Write today. No obligation. No agents to bother you.

AMERICAN SCHOOL OF POULTRY HUSBANDRY  
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Please Mention Popular Mechanics



# Smyth's 60 Incubator

ALL STEEL

On 30 Days' \$  
FREE TRIAL **3<sup>92</sup>**  
Holds Full  
60 Eggs



To quickly popularize SMYTH'S All Steel 60 Egg Incubator, we will sell 5,000 at only \$3.92 each. Guaranteed to hatch as large a percent of strong, healthy chicks as any incubator made, regardless of name, make or price. Made of polished steel, with double walled air chamber, 1917 improved flip regulator, standard thermometer visible through glass damper, best safety metal lamp, heat distributing drum around outer edges, water jacketed heat flow

and automatic heat regulation insuring even temperature and moisture in every part of egg chamber, and proper heat to eggs all the time. Full directions with. **SEND \$1.00** deposit and we will send you this high-grade, latest improved SMYTH'S all steel 60 egg incubator by express, subject to examination. Pay balance \$2.92 and express charges to agent after you find the incubator perfectly satisfactory and the greatest incubator bargain in **TRY IT 30 DAYS** at our risk, and the world, then take it home and it is good wherever you live now or hereafter, regardless of price to make, or if for any reason you are dissatisfied, return at our expense and we will refund your \$1.00 and freight charges. **PARCEL POST** send \$3.92 and enough money if you want incubator sent by parcel post. We make very low prices on larger incubators, brooders, and poultry supplies of all kinds in our big free Incubator Catalog sent you free upon request. ORDER INCUBATOR OR CATALOG TODAY.

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With 25 fruit trees, abundance of small fruit, 100 chickens. Good soil and water. Best of Markets. Boats and Railroads direct to all main ports and cities. Farm is close to Traverse City, Mich., with 12,000 people. Convenient to depot and canning factory.

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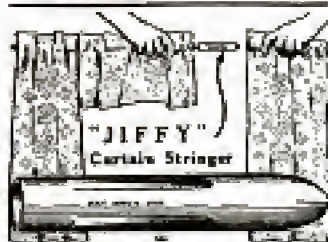
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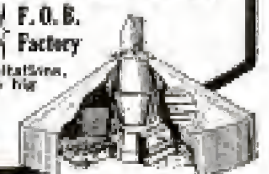
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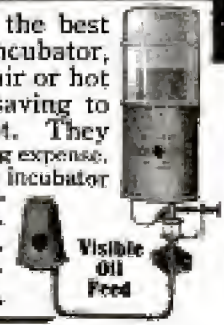


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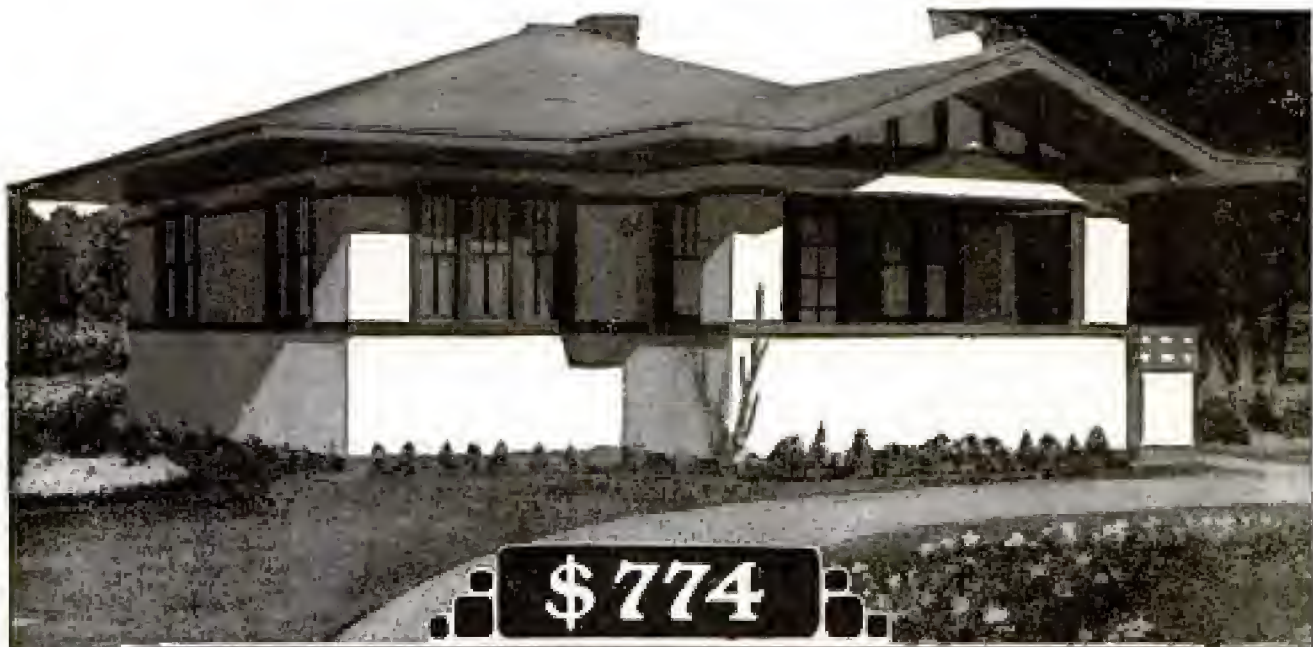


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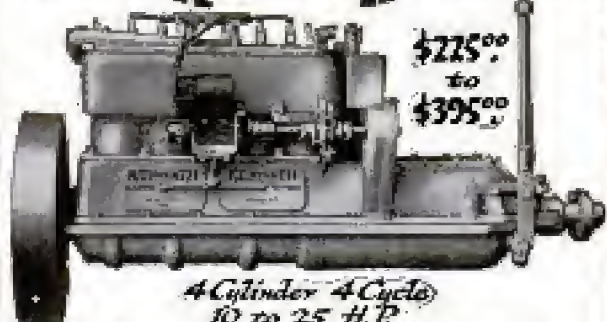
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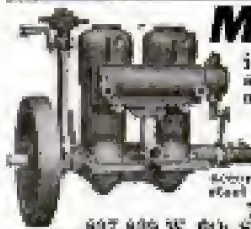


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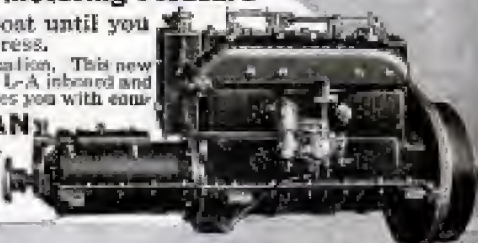
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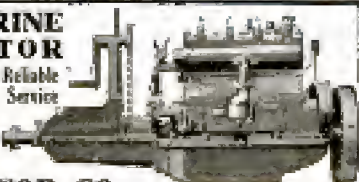
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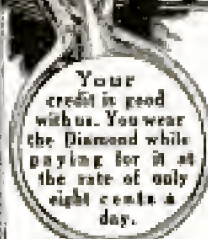
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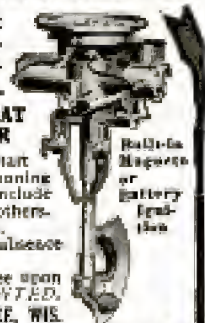
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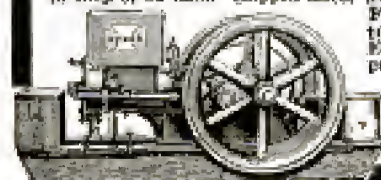
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The Government is supplying our Navy with shoes having soles made of a leather substitute, and is experimenting with the tanning of sharks' hides to help relieve the leather situation.

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For sock linings, facings and tongues of shoes.

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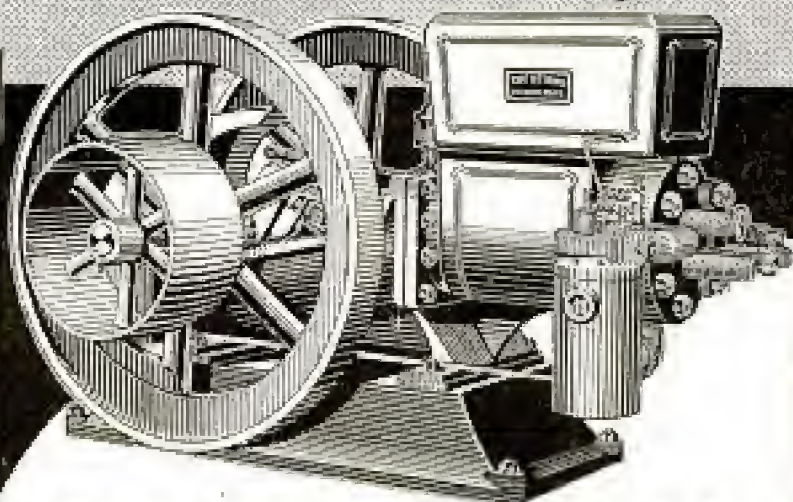




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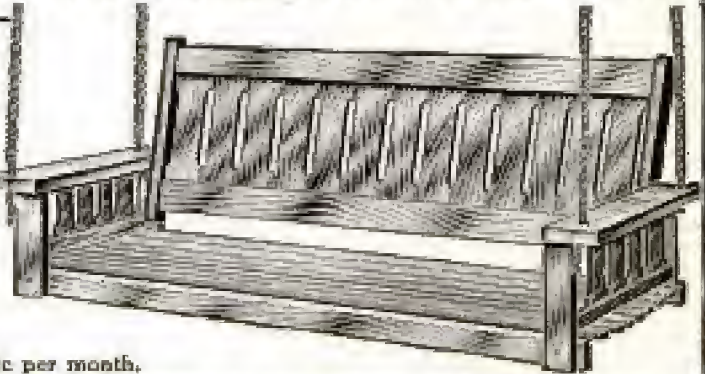
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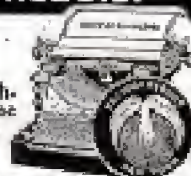
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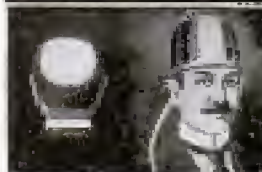
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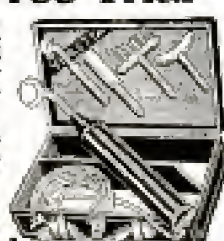
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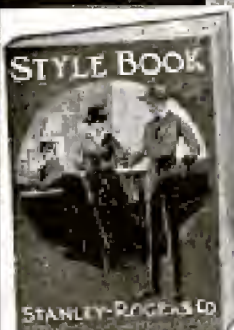
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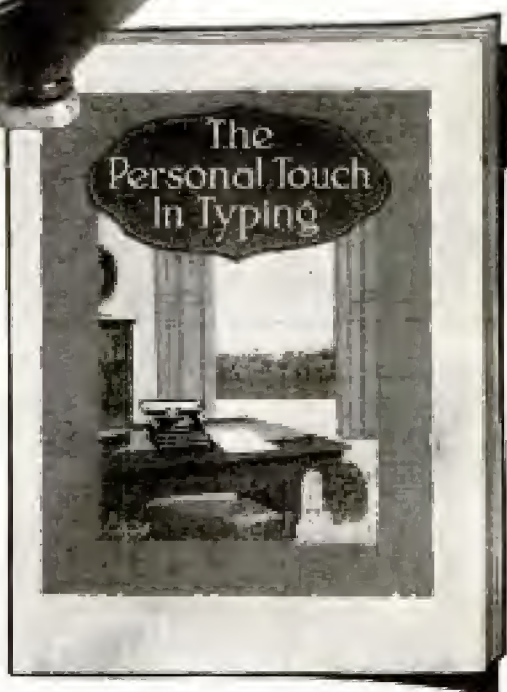
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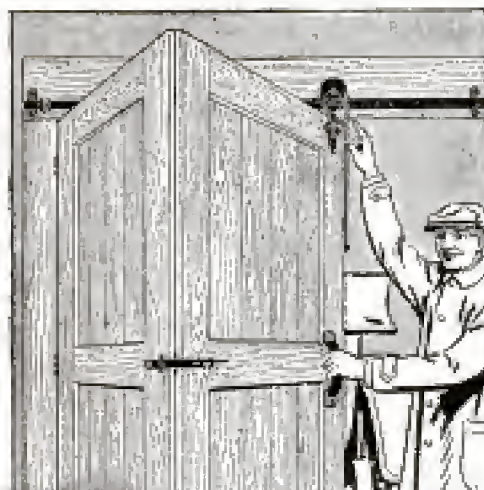
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# OSTER

### PIPE-THREADING MACHINE



#### No. 300 A

Threads straight pipe, bent pipe, and nipples from  $\frac{3}{4}$  in. up to 2 inches; bolts from  $\frac{7}{16}$  to  $1\frac{1}{4}$  in. Finished with belt or motor drive.

Other sizes thread 1 to 4 in.,  $1\frac{1}{4}$  to 6 in. and  $2\frac{1}{2}$  to 8 in.]

third says: "Saves 40% of former pipe-threading expense." There's a book called "Actual Pipe-Threading Experiences" which tells about these machines in detail in stories told by users. Write for it and get our catalog also.

**The Oster Manufacturing Co.**  
2100 E. 61st St., Cleveland, Ohio, U. S. A.

Catalog of  
"Bull Dog"  
Die-Stocks  
on Request

Please send "Actual Pipe-Threading Experiences" and catalog to

Name.....

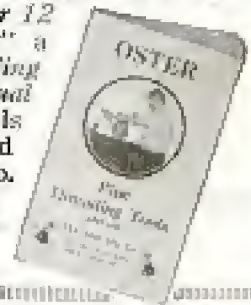
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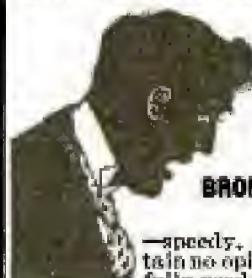
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See Oct 16 for 554



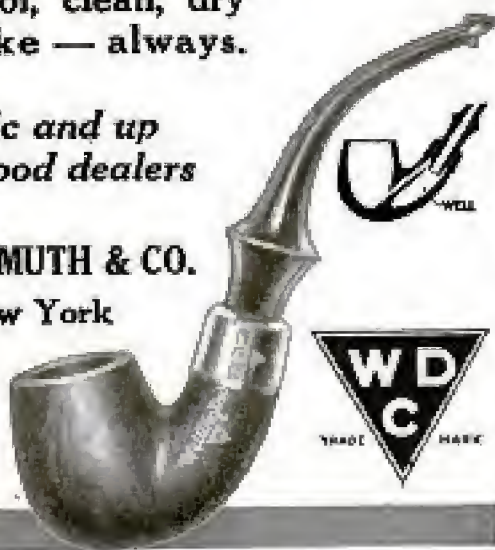
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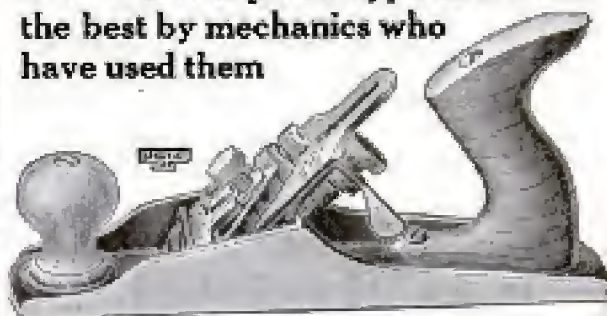
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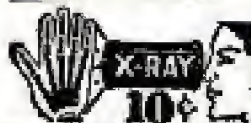


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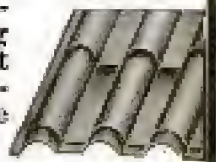
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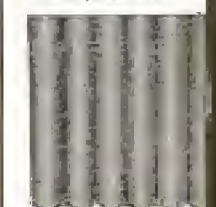
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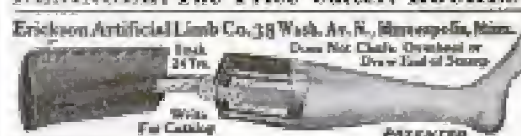
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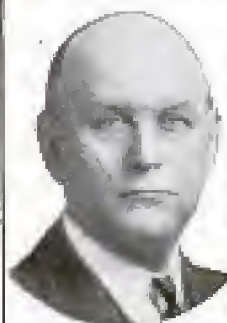
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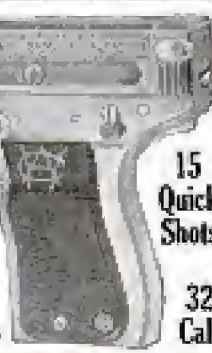
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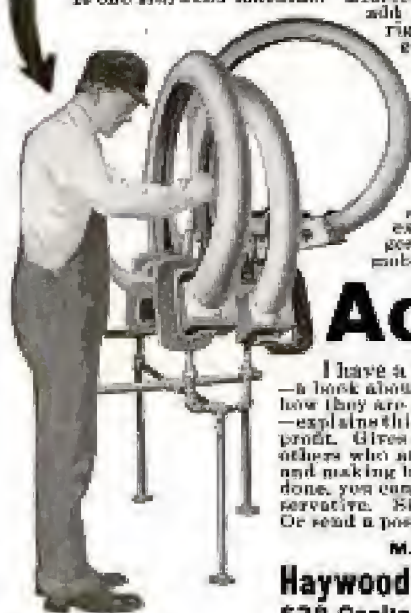
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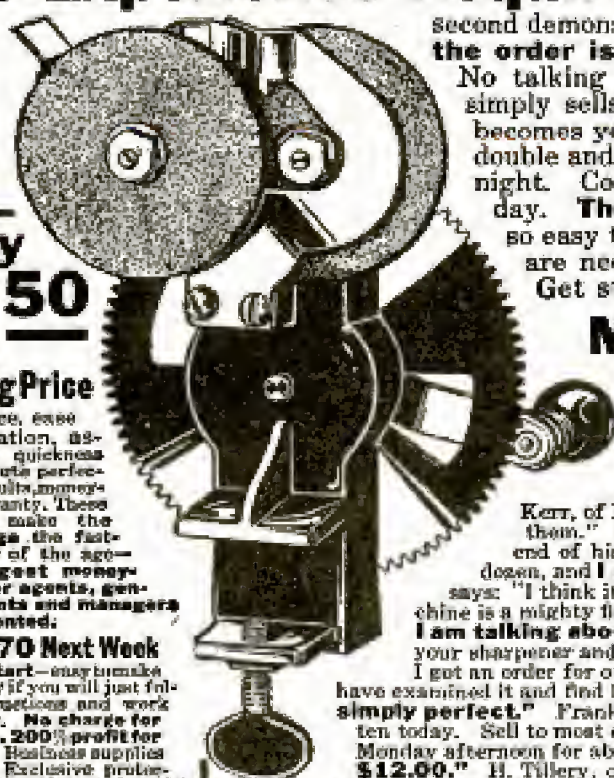
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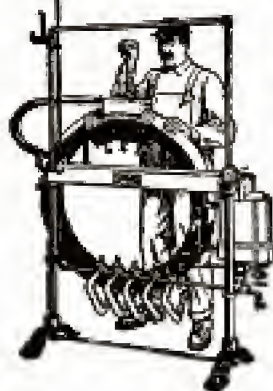
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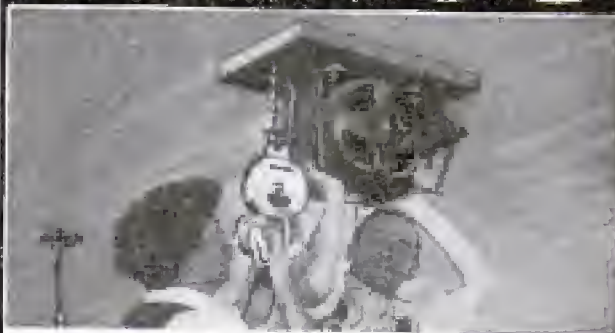
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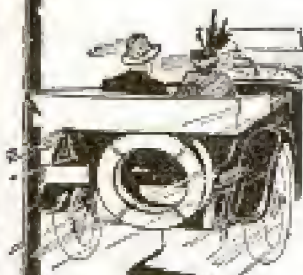
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Complete with carbon-diamond wheel, buffing wheel, sand, plug and pulley. For spark gaps—grinding—polishing, and to drive small machinery, sewing machines, fans, etc. Operates on A. C. or D. C.—110—120 V. Speed 6000 R.P.M. **\$5**

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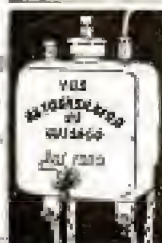
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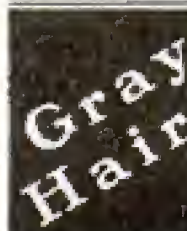
**CLAPP-EASTHAM CO.**

147 Main Street Cambridge, Mass.



## A Birthday Present

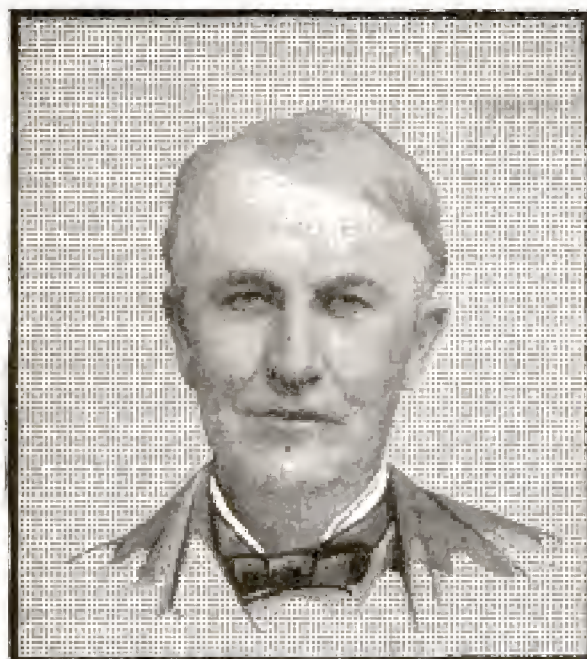
If you are racking your brains to think of a suitable birthday present—stop. Go to any dealer and ask to see Ingersoll watches. There are eleven kinds from a \$1 to \$3.



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Mary T. Goldman's Gray Hair Restorer restores original color mildly and healthfully. Different from any other. With not wash off. Looks natural no settlement. Sample and comb absolutely free. Be sure to describe original color of your hair. Lips 30c bottle, \$1.00, 3 for \$2.50. Mary T. Goldman, 343 Colfax Bldg., St. Paul, Minn. Established 50 Years





*Published in Edison Edition*

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**Thomas A. Edison,**  
*Orange, N. J.*

*September 24th, 1914.*

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Scranton, Pa.

Dear Sir:

I am sorry that circumstances prevent me from attending the 25th Anniversary of your wonderful institution.

I have watched the progress of the I. C. S. almost from the very beginning and while your rapid growth might be marveled at by some, to me it is easily understood, because I realize the practical value that is back of it and know ever-thing too of the success attained by many ambitious men through out the country who have taken your courses.

May your splendid institution continue to do good and flourish that the world will soon be appreciative the actual worth of an I. C. S. trained man.

Yours very truly

*Thomas A. Edison*

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The most wonderful and ingenious Camera made

It is but little larger than a watch, which it closely resembles. You can carry the Expo about in your pocket and take pictures without any one being the wiser.

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The Expo loads in daylight with 10 or 25 Exposure Films, costing 15c and 25c respectively, and the picture taking part of a whole day's outing may be had for a very nominal sum — One cent a picture.

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SEEDS 15c, packet, 3 for 40c, postpaid.

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**NATURE'S WEATHER PROPHECY** By mysterious changes that take place, this remarkable plant accurately forecasts the weather many hours in advance. Will grow anywhere all the year around. An interesting house plant. Bears large, beautiful, pink, heavenly scented flowers.

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### GROW EASILY FROM SEED

The Ground Almond has a flavor that is MOST EXCELLENT, resembling the coconut. The meat is snow white, covered with a shell or skin of brown color. It grows close to the surface and anything from 200 to 300 Almonds may be expected from a single ear. There is no trouble whatever in growing anywhere and every kind of soil. Maries planted any time, and in eight or ten weeks from time of planting you will have an INCREDIBLE CROP of the MOST DELICIOUS ALMONDS YOU EVER TASTED. Seeds 15c/Pkt.



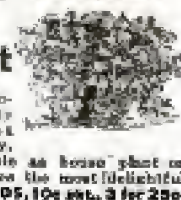
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SEEDS, 10c pkt., 3 for 25c.

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NITTO'S PLANT FOOD is clean, odorless, and highly concentrated. It is used in liquid form on all kinds of plants, shrubs, roses, ferns, lilies, berries, beans, fruit, flowers and vegetable gardens. It changes ill-nourished plants into LUXURIANT BEAUTIES, producing masses of blossoms that will equal any. Causes plants to bloom early and ahead of others. Your friends will marvel at your success. Makes no difference how healthy or how delicate your plants may be. Nitto's Plant Food will bring out New Foliage and Flowers, and cause a MARVELOUS TRANSFORMATION. 15c



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Fires  
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This is a regular size automatic revolver. Shoots B. B. shots obtainable anywhere, same as other rifles and guns. Repeats 20 times with one loading. Handsomely finished in gun metal. No caps or load necessary, as it works with a spring and shoots with rapidity and accuracy. Simply load with 20 B. B. shot, then press the trigger. Nothing to explode—absolutely harmless and safe. Remember, it is not a mere toy, but the same size and shape as a REGULAR AUTOMATIC. Sent complete with a round of shot for ONLY 25c postpaid. Extra shot, 10c a package.

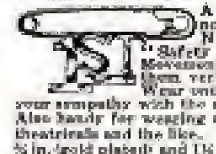
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Stops a  
leak in a  
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The finest restorer for Ironware, Agateware, Enamelware, etc. Good for kettles, pots, pans, boilers, and every kind of ironware. Also for tin, copper, aluminum, tea boxes, iron pipes, cracks in stoves, broken china, porcelain, brick-a-brac, blazes, crockery, woodwork, marble, etc. Will not chip, burn, bake or boil out. THE MEND IS THE STRONGEST SPOT IN THE POT. Could not be copied! Just rub the powder with water. HARDENS LIKE IRON. Fire-proof. Water-proof. You can fill a big hole or a small crack. Mended places stronger than new. Replaces chipped enamel. Anyone can do it! PATENT IS IRREVOCABLE. Better and easier than solder. Three sizes, 15 cents, 25 cents and 50 cents.

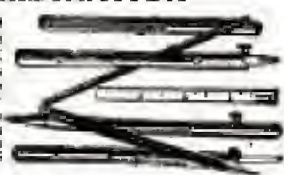
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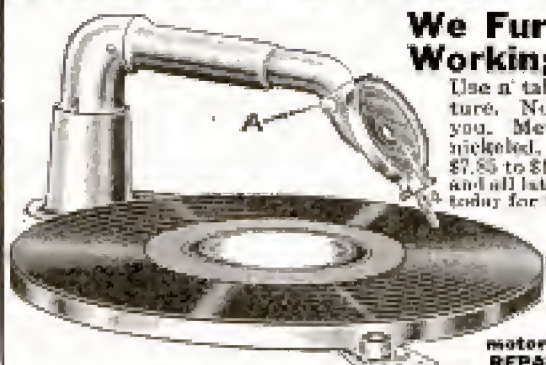
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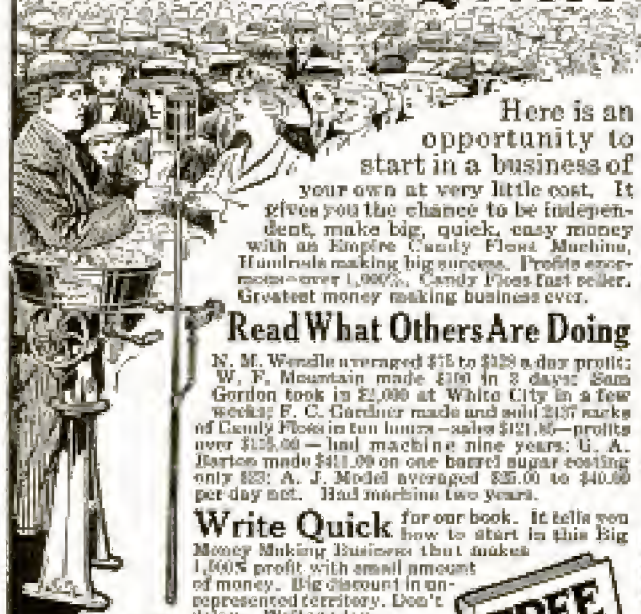


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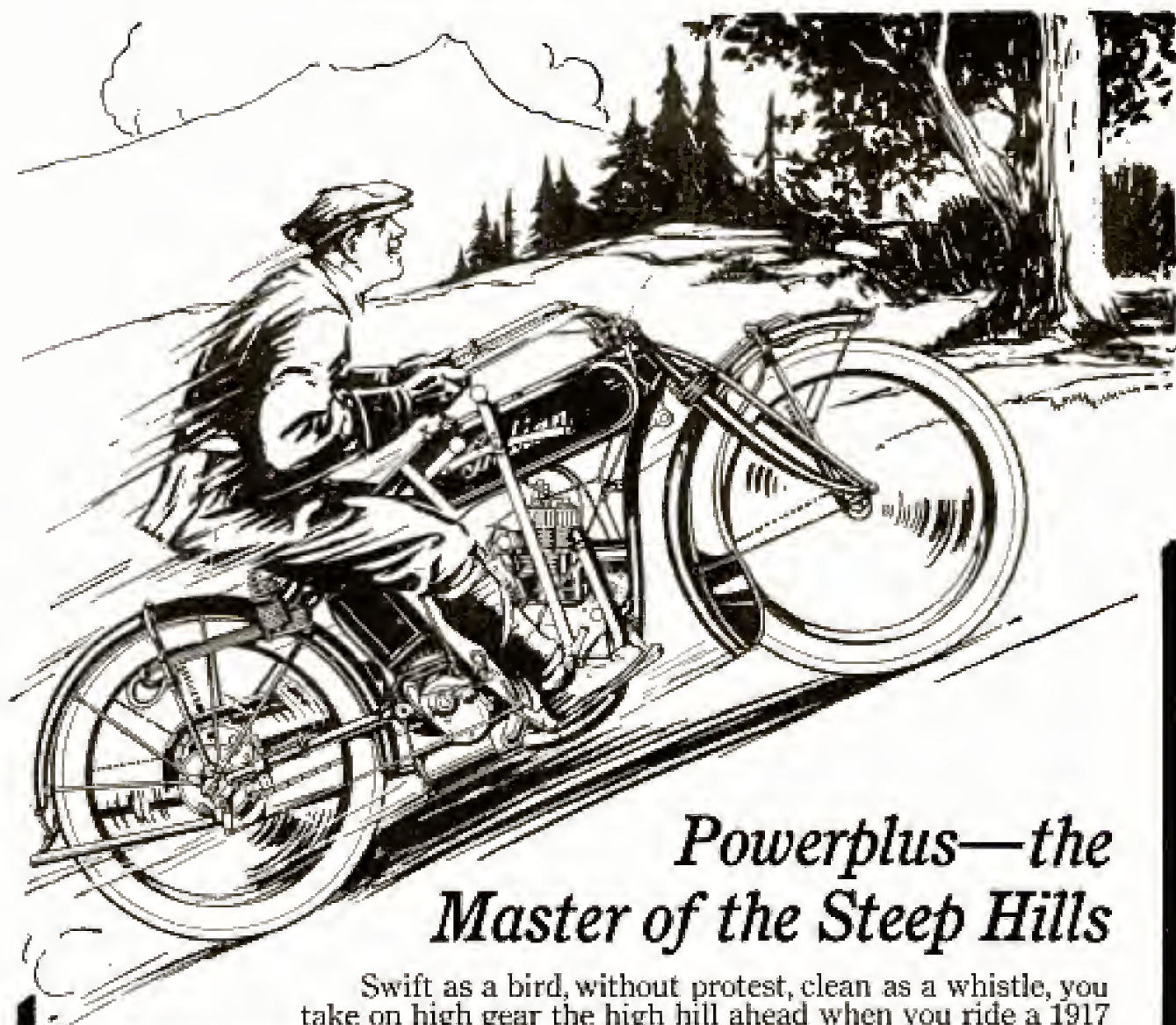
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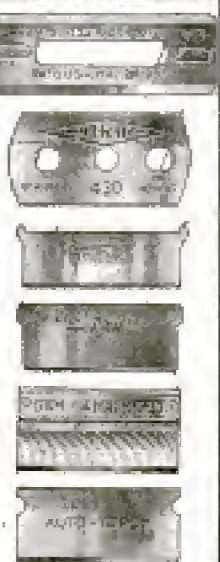
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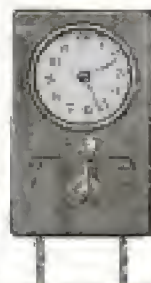
It will work on any kind of a furnace—steam heat, hot air, hot water or vacuum. The workmanship throughout is the highest grade.

**Agents Wanted** May sales and big commissions, not a single dissatisfied customer, everyone placed helps to sell more. Write today for particulars.

**The Stalker Furnace Regulator Co.**

715-725 Detroit St.

ANN ARBOR, MICH.



## HEALTH—BEAUTY—VIGOR

Health, beauty and vigor are now yours. The body can be kept active and vigorous by proper use of vibrator. Nothing restores and keeps the whole system in such prime condition as regular use of Nu-System Vibrator in home or office. Ten minutes daily does trick. It relaxes and invigorates tired and overworked people, restores to health the nervous and sickly, and is sold at a price within the reach of all.

**\$15.00 Nu-System Electric Vibrator \$9.85**  
**Special Introductory Price**

Something entirely new, electrically operated, is clean, light weight (made of aluminum) will last a life time. No motor, no wear, no oiling, no care. Only one moving part. So simple a child can operate. From the stock of a \$15 vibrator. Is absolutely safe. Guaranteed for a year but will never wear out.

**SPECIAL 30 DAY FREE TRIAL OFFER**

We have enough materials to make this 30-day free trial offer to those who act quickly. Regular price is \$15.00, special price \$9.85. Send money order today, or write for literature and Special 30 Day Free Trial Offer. Don't delay. **NU-SYSTEM VIBRATOR CO., 22 Butler Bldg., Detroit, Mich.**

## MEN WANTED

to represent our company. You can easily make from \$25 to even \$50 a week and be your own boss. Send for our agent's proposition and

**ILLUSTRATED BOOK AND FREE PHOTOGRAPH**

Send ten cents to cover postage and packing costs and we will mail you our illustrated book showing 50 large handsome illustrations of our many genuine photographs and different poses, also a free glass of one of our most famous beauties.

**ART PHOTOGRAPH CO.**

Tower Bldg., Chicago, Ill.



Write Today

## Hildebrandt Baits Hook & Land 'Em



Made in 3 shapes, 11 sizes and 6 finishes. Reversible blades, interchangeable flies, providing outfits for any kind of game fishing.

Send for Tackle Catalogue with color sheet. Logansport, Ind. John J. Hildebrandt Co. 1942 High St

## Tour Anywhere—Without Hotel Bills

Hitch an Auto-Kamp Trailer to your car. Be at home anywhere, with a completely equipped living and sleeping tent, electric light, two full size beds, cook stove, ice box, complete cooking outfit, dishes, cutlery and dust-proof food compartment that carries an ample supply of food for several people.

**The AUTO-KAMP TRAILER**

saves hotel bills, garage expenses, delays and discomfort.

Write today for Free Brochure

**THE AUTO-KAMP EQUIPMENT CO., 2107 Sheridan Ave., SAGINAW, MICH.**

## Landa "New Idea" Billfold

Elegant, Practical Pocketbook for LADIES or GENTLEMEN. Model result of 35 years' experience. Combines currency fold, coin purse, card case, loose-leaf memo pad, 1912 calendar, identification card and transparent photo frame. Made of finest, soft, black Best Grain Leather—stainless-steel sewing machine. Compact, thin, flexible. With many pockets for bills or gentlemen. Size closed, 3 1/2 x 5 inches; open, 5 1/2 x 5 1/2 x 3. Special price direct to consumer, \$12.50, \$10.00, \$7.50, \$5.00, \$2.50 each. Also come in Morocco, leather, gold, silver, nickel, etc. Landa "Billfold" is made in finest Morocco leather. Special Price, direct to consumer, \$1.00. Worth \$2.50 each. \$10.00, \$7.50, \$5.00, \$2.50 each. Order either kind (see page) and friends. Send today. Draft, M.O. or postage stamps. Order shipped day received. Write for Landa Leather Goods Catalogue and Landa Reason for Low Prices.

**A. LANDA & SONS CO., Manufacturers**

Dept. 2K

CHICAGO

**Name Engraved FREE—23 Kt. Gold—Postpaid 50c.**

## Big Money-Making Opportunity



Buy a Wilt Blade Sharpener—become independent. Large field, big profits. Small investment (\$135 complete with motor). Sharpens, hones and strops all safety razor blades. Act now!

**WILT MACHINE CO.**

74 Bagley Ave. Detroit, Michigan

## TAYLOR CRANK SHAFT TIRE PUMP

Takes all the labor out of Tire Pumping. No installation cost. Carried in tool box when not in use. Pays for itself in increased mileage. **\$10**

**TAYLOR MFG. CO., Dept. P. REDFORD, MICH.**

## HIGHLAND

**The World's Standard Commercial Body**

Just the Delivery Body you want and just the price you want to pay.

**THE HIGHLAND BODY MFG. CO.**  
202 Elmwood Pl. CINCINNATI, O.

**FREE**

**BOOK TELLS HOW TO MAKE \$150 TO \$1000 PER MONTH**

Making celebrated Flavo-Nature-Flavored Flour in rural communities or small towns with

**AMERICAN MARVEL Flour Mill**

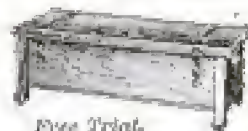
(Self-Contained) You can quickly become a member of Community Marvel Millers. We start you. Help you. 30 days' free trial. Investment and terms easy to handle. Write for fully illustrated book. **ANGLO-AMERICAN MILL CO., Inc.**  
135-141 Trust Bldg. Owensboro, Ky.



## FREE TRIAL

**White's RED CEDAR Chests**

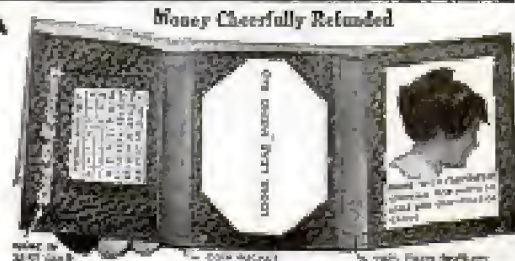
protect the finest garments, furs, etc., from moth and other vermin. Finest Gift. Send for FREE catalog today.



Free Trial.

**J. A. WHITE LUMBER CO., Box 33, WARSAW, ILL.**

Money cheerfully refunded



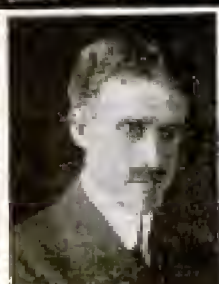
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# Free Test Lesson

**Wonderful  
Opportunity for Every Ambitious  
Man To Decide Whether or Not To—**

## Be A Draftsman!



Charles W. Moore  
Pres. of the College  
and Head of a Large  
Chicago Firm of Engi-  
neers and Contractors

Here is, without doubt, the most wonderful offer ever made by a Correspondence or Home Study Institution of any kind. Just think of it! We positively will send you a **Free Test Lesson in Draftsmanship** without any obligation on your part whatever. Just

the coupon brings you **Free Test Lesson**. We don't even ask you to pay postage. We do that.

We send you this **Free Test Lesson** at our expense simply because we want you to see for yourself that the Chicago "Tech" Course in Draftsmanship is the most practical, simplest and easiest to master of any course ever written on the subject. This **Free Test Lesson** also positively proves that our Course will fit you for a Draftsman's position in the shortest possible time. It will prove that our Course will give you the practical knowledge necessary to make you an expert in any branch—Architectural, Structural, Machine Drafting or in the Building Line. It will prove to you that in Draftsmanship lies your future.

### Investigate

If you are wide awake to the possibilities of Draftsmanship as a profession—if you are ambitious—you will at once send coupon for this **Free Test Lesson** and investigate the great future for you in this Big Income Paying Profession.

At present, thousands of Draftsmen are needed in all branches. The demand is increasing every day. The wonderful boom in all businesses in this country has created positions for more trained Draftsmen than can be recruited from the ranks for years to come. Our Special Training is the short cut that brings you to the top quickly. If you start **NOW**—in a comparatively short time you will be qualified to step into these big paying positions and

## Free



Complete Drawing Outfit  
and Full Instructions  
in Mechanical Drawing  
Sent **FREE**  
on Enrollment

### See for Yourself

This **Free Lesson** is an absolute test, pure and simple. Send for it today. In the privacy of your home study it, then you will know for yourself whether you are proper material for a successful Draftsman. Other institutions will ask for your money first. You find out later at your own expense, whether you can adapt yourself to the work and succeed in this profession.

We do not charge you one cent for the Test Lesson, either now or later. It is absolutely **FREE**. Nor do we obligate you in any way whatever by writing for the **Free Test Lesson**, so send coupon or write postal request today. If you do nothing else but secure the **Free Test Lesson** you will gain such valuable knowledge as will be beneficial to you through life, for the **Free Lesson** gives the very fundamentals of draftsmanship which are helpful to every man.

## Earn \$25 to \$100 a Week and More

You can do it—with our help. We have successfully trained thousands of ambitious men—fitted them to qualify and hold the best positions in the business. Some of these men attended our school in Chicago—others learned at home—in spare time, evenings, through our simplified, new Correspondence Method. What we have done for these men we will do for you. No special advance training is necessary. The only qualifications you need possess are the ability to read and write. It will pay you to investigate. It means a big future—independence, prosperity, happiness for you.

**CHICAGO TECHNICAL COLLEGE**  
1025 Lake View Building, Chicago, Ill.

### MAIL THIS COUPON

**CHICAGO TECHNICAL COLLEGE,**

1025 Lake View Building, Chicago

Without obligation to me, please send me your **FREE Test Lesson** in Draftsmanship and other interesting literature covering the subject indicated below.

Mark X opposite work in which you are specially interested.

Architectural Drafting.	Building Superintendence.
Builder's Course.	Structural Steel Drafting.
Estimating.	Sheet Metal Drafting.
Plan Reading.	Reinforced Concrete.
House Planning.	Machine Drafting.
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Name.....

Address.....

City.....State.....

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## MAKE BIG MONEY Concreting In Your Section

You can easily earn \$8 to \$20 a day with a Sheldon Batch Mixer. Our customers are doing it right now. The jobs go to the man with a Sheldon Mixer every time. Saves labor of 1 to 4 men, according to size of job. Or, if you buy machine for your own use, you can make many times its cost in a season by renting it to your neighbors.

**Build Your Own Walks, Floors, Foundations, Buildings, Silos, Tanks, Troughs, etc.**

out of concrete with a Sheldon Batch Mixer. The ideal machine for all small jobs. Will pay for itself on first small job. Beats hand mixing a mile. And it's a lot cheaper, too. Takes the backache out of concrete. Makes possible those many small improvements about the place; you wouldn't do without it. Improvements that save time, labor and money and add many dollars to the value of your property. Just the machine you need.

## Make Your Own Concrete Mixer.

At a cost so low you cannot afford to mix concrete by the shovel method. Along with our iron parts we send **Free Plans** and permit for making your own machine. Or, we will sell you the complete machine. Two styles, hand or power. Will mix 2½ cu. ft. a minute. Keeps 1 to 6 men busy. Has chain drive, self-tilting dump, easily moved, and all parts guaranteed. Does work equal to \$400 machines, costs less than 1.10 as much. No other machine like it. Patented.

**Write for FREE Catalog and Special Offer**

Shows our full line. Sold direct to you on strong guarantee, backed by 30 days' trial. Ten men wanted in every county right now to accept our special offer, which will help you secure a machine at little or no cost. Write us today for catalog and particulars of offer.

**SHELDON MFG. CO.**  
Box 3578 NEHAWKA, NEB.

**Sheldon Batch Mixer**

**FREE  
Plans**

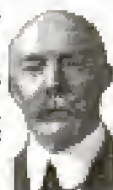


**\$11.50 up**

## Are You Succeeding?

—or just wishing for success? Schwab, Wainmaker, Burbank, Roosevelt and a host of other eminent men adopt and recommend the Marden way to success. Marden's "Everybody Ahead" shows you how to have power, money, happiness—success. Send for free examination plan. Start on the road to fortune today.

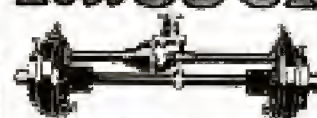
**FRANK E. MORRISON, Dept. 60, 1133 BROADWAY, N. Y.**



Have your house warm when you get up in the morning—open your furnace drafts automatically before you awake. Send \$1 for complete instructions for making your own automatic draft-opener. No skill or special tools required. Very inexpensive.

**THE GRAVES CO. 600 Hill Street DUBUQUE, IOWA**

## Russel Internal Gear Drive Axle



The most serviceable and economical motor truck axle made. Write for convincing reasons why your truck should be equipped with the Russel Axle.

**RUSSEL MOTOR AXLE COMPANY, Central Ave., North Detroit**

## \$42 The Famous FOX

The lightest running typewriter in the world.

### Latest Rebuilt Model 24

—from our Factory to your office or home for \$42. Send any amount with order you can spare and pay the balance \$5 monthly. No interest. No red tape. 3 years' guarantee.

**FOX TYPEWRITER CO., Grand Rapids, Mich.**



## Healthy Men Employed

They must be dependable—Must be on the job every hour of the day—And every day. We have no time for physical weaklings or nervous wrecks. At the best they are uncertain quantities—Scary the captains of industry everywhere to-day. Can you meet these rigid requirements of our modern strenuous life? If not you are already foredoomed to failure in the race. The doors of opportunity are closed to you. The relentless hand of unsentimental business necessity is everywhere turned against you. You are the undesirable citizen.



### How About You Young Man?

You who have wrecked your future by deplorable habits, not realizing the consequences? Do you know that the **STRONGFORT METHODS** can lift you out of the depths and bring you back to the bloom and vitality of **Real Manhood and Success**. Your half-sickness shows plainly in your face and the world loves healthy people. **Be Healthy—Strong—Vital.** That's living. Don't think too long, send for a free copy of my book, "**Intelligence in Physical and Health Culture**." Written by the strongest physical instructor in the world and learn how to fit yourself to command the best positions. Write a short history of your condition, which I will treat in the strictest confidence, and advise you without charge.

**LIONEL STRONGFORT, Physical Culture Expert**  
25 Park Bldg., NEWARK, N. J.

Be Sure It's **"POROSKNIT"**  
**GENUINE SUMMER UNDERWEAR**  
Cool, elastic, comfortable—**GUARANTEED**  
Chalmers Knitting Co., 78 Washington St., Amsterdam, N. Y.

ANHEUSER-BUSCH'S  
*Malt-Nutrine*

—an aid to digestion;  
a nourishing, strengthening  
liquid—food- tonic.



### "Bow Legs and Knock-Knees"

Unsightly Send for booklet showing photos of men with and without

**The PERFECT LEG FORMS**

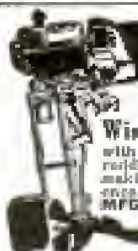
**Perfect Sales Co., 140 N. Maryland Ave., Dept. 3**  
South Station, CHICAGO, ILL.

**\$150 EXHIBIT A WIRELESS U-53**  
**MAKES \$1000 QUICK**  
The public is eager to see a U-Boat since U-Boats are the most important in the present war. For \$150 will furnish a first perfect working model Wireless Submarine for exhibition and 10-foot water-tight canvas tank, etc. It is the best for experiments. Owners making BIG MONEY.  
**U. S. WIRELESS SUBMARINE CO., Laboratory, 804 Fifth Ave., New York**

## Hamilton Multimeter

a recording instrument  
of scientific accuracy.

**The Hamilton Corporation, Lancaster, Pa. U.S.A.**



## Earn Money

this summer demonstrating the  
**Wisconsin Detachable Row Boat Motor**  
with woodless propeller, patented top adjustment; rubber-encased or self-locking tiller. Easy to use, safety-making features; quick action, good profile. Ask at once. Get catalog. Write **WISCONSIN MACH. & MFG. CO., Motor 24, Milwaukee, Wis.**  
Makers of Marine Motors for 14 years

## World's Best Shoe Value \$3.25

Ruthstein's Relentless Shoe for Men made of selected Gun Metal Calf-leather sole: Good. Your Welt Remedy: comfortable, roomy last. Blucher Lace. Styles D to EE widths. Money back if examination proves otherwise.

**200 OTHER SHOE BARGAINS FOR MEN, WOMEN, BOYS AND GIRLS**

Also Complete Line Ruthstein's Famous Steele Big, New, 1917 Scientific Footwear Catalog shown how to save 25 to 50 per cent on shoes—FREE.

**RUTHSTEIN SCIENTIFIC SHOE CO.**  
We Retail at Less Than Wholesale Shoe Prices  
Dept. 640 RACINE, WIS.





# Make Your Own Movies!

That's the New Year Message to the Boys and Girls (and grown-ups too) of America. "MAKE YOUR OWN MOVIES"! A wonderful invention has been given to the world. A Moving Picture Camera that will give more fun, more real enjoyment, more marvelous opportunities for pleasure and education than any other invention that ever came from human brain.

No more dead, lifeless photography, no more *wishing* you could make a movie, but now, *living photos*, and you, dear boys and girls (and parents too), your own moving picture makers—

Of everything that lives or moves—sports, games, events, plays, scenes, people, your brothers and sisters, your mother and father, your comrades, your pets, anything, everything you want to make live again upon

the screen in your own home. *You*—just think of it, how marvelous it is!—can take, create and reproduce all these living, moving pictures *yourself*.

And this great invention makes these miraculous possibilities of living photography even more simple than still photography. There isn't a thing to learn that a child can't master in a minute or two. It is all done for you almost automatically by this wonder-working machine called the



Home Movies! That's what you and everybody can have now. The MOVETTE is a *real* moving picture camera. It takes any picture equally as well as a thousand dollar professional camera. But the MOVETTE is so simple and light and compact, you can take it anywhere, and 131 patent claims have been applied for by the inventor of the MOVETTE. It's the most wonderful camera in the world—*what it is and what it does*.

## THINK, A MOVING PICTURE CAMERA for less than thirty dollars!

It's almost too good to be true. Then think of this: You can buy 50 feet of Movette film for \$1.50; that means a two minute living picture—1600 snap shots. Or think of this: You can take one foot of film—32 snap shots for 3 cents, and any of these snap shots you can enlarge for 25 cents!

The MOVETTE is the master-piece of all cameras; you can do anything with it; still photography or moving pictures. No focusing; all you have to do is to keep the picture in the view finder. Daylight

loading in thirty seconds, no dark room necessary. It's a miracle in a metal box—that's what the MOVETTE is. It has given a new meaning to photography. It is the most wonderful invention for entertainment and education ever given to the world—It will amaze you.

Fill out the coupon—Let us tell you more about the MOVETTE—there's a fascinating booklet for you—Free—

Mail the Coupon Today

MOVETTE CAMERA CORPORATION, 1167 University Ave., Rochester, N. Y.



## TEAR OUT SIGN-MAIL

Movette Camera Corporation,  
Rochester, N. Y.

P. M. 2-17

Gentlemen: I'm interested in MOVETTE. Please send me your interesting new book, "The Scientific Wonder of It," and other particulars without cost to me.

Name .....

Address .....

City.....State.....

**Every Dealer Sells It—You Can Buy It EVERYWHERE!**



# BLUE STREAKS



## Why These Are Good Tires



Suppose we were not giving the best value possible in Goodyear Blue Streak Bicycle Tires. Suppose we scrimped and saved on the material and workmanship that we put into these tires. Now, as you know, the biggest part of our business is in automobile tires.

How could we get around this fact that would meet us at every turn:

*The bicycle riding boy of today is the automobile owner of tomorrow.*

We have got to make a good bicycle tire now if we expect to sell you an automobile tire in the future.

You may be doubly sure that Goodyear Blue Streak Bicycle Tires represent the best possible value when you consider the world-known honesty and fairness of The Goodyear Tire & Rubber Co., which makes them.

The Goodyear Tire & Rubber Co., Akron, Ohio

GOODYEAR  
AKRON

Please Mention Popular Mechanics





# Any Weather Is Billiard Weather! And Any Home Has Room For a BRUNSWICK Table

Carom and Pocket Billiards are a captivating sport, and nowadays the Brunswick Home Table is the family playground. *When school lets out it quickens home-bound footsteps.*

Soon then the clicking balls proclaim that eager eyes are training to debate dad's mastery when he arrives from work.

This manly love of skillful achievement is built right into these scientific Brunswicks. They are packed full of health, they are wrapped with tense moments, and *they're brimming over with raillery and laughter!*

## Used By Experts

Many professionals use Brunswick Home Tables. Accurate angles, fast ever-level beds and quick-acting Monarch cushions give them expert playing qualities.

Fine oak and handsomely figured mahogany, richly inlaid and built to last a lifetime.

All reproduced in actual colors in our de luxe catalog. Write for free copy today.

## Low Prices—Free Trial

Test any Brunswick 30 days at home and *pay while you play*, if you keep the table. Prices are low because we are selling to thousands.

Balls, Cues, Expert Book of 35 games, etc., given free with each table.

## Mail This Coupon Today

Learn how our "Quick Demountables" can be set up anywhere and put in a closet when not in use. See the "Grand" and celebrated "Baby Grand."

Get full information and color-pictures of tables in our latest catalog—Billiards—"The Home Magnet." The coupon brings a copy free by return mail. Send today.

## BRUNSWICK HOME BILLIARD TABLES

The Brunswick-Balke-Collender Co.,  
Dept. 458, 623-633 S. Wabash Ave.,  
Chicago.

Without incurring any obligation I would like to receive a copy of your color-catalog  
"Billiards—The Home Magnet"

Name .....

Address .....

Please Mention Popular Mechanics



# SAVE 1/2 - INSTALL YOUR OWN PLUMBING AND HEATING

## NEW HARDIN EASY WAY

HARDIN-LAVIN CO  
CHICAGO

### No More Cold Bathrooms

Nothing makes home more inviting or more healthful during the cold winter months than warm, toasty, even heat. Keeps everybody healthy and happy. Install one of our

### Heating Plants Cut-to-Fit

No loss or waste—hot water, steam, or air. Send for our free estimate. We can save you 1/2. We furnish simplified installing plans, specifications, and instructions, and lend you the tools. Any handy man can do the installing the new Hardin Easy Way.

*If Your Bathroom is Modern so is Your Home*



New Tankless Flushometer



Drop Apron Lavatory



BATH TUB



HANDY-MAN BOOK

**NAME** \_\_\_\_\_  
**ADDRESS** \_\_\_\_\_

**MAIL COUPON FOR FREE "HANDY-MAN" BOOK**

**Let Our Service Dept. Help You**

Draw a rough sketch of your plan for any heating or plumbing installation, and our staff of engineers will show you the easiest, cheapest way, and supply easy installing plans absolutely free to YOU. Any handy man can do the work with the help of our engineers and save all plumbing bills. We make all shipments promptly, direct from our nearest factory.

**Highest Quality—Wholesale Price**

Remember, everything we sell is Grade A. Highest Quality Guaranteed Goods at prices that will surprise you. You save not only on the cost of the goods but on the cost of labor. Our practical experience of 40 years enables us to furnish heating plants with new, original features, combining quality, economy, simplicity, easy installing, and lasting durability.

**Handy-Man Free Book**

This book has been written for the handy man about the home. Aside from being our Catalogue, it contains many pages of practical information and money-saving suggestions pertaining to home improvements. It's worth a dollar of any man's money, but if you are interested in up-to-date plumbing and heating goods, we send it FREE. Send for this valuable book and learn how to buy all plumbing and heating supplies on a time-saving, labor-saving, money-saving basis.

**Immediate Delivery** This is as much a service as our guaranteed quality or wholesale prices.

**40 Years in Business**

at the same address is a record to be proud of. It speaks volumes for our wholesale price policy and money-back guarantee. Send for free "HANDY-MAN" Book, and full particulars. \$500,000 plants behind our guarantee.

**The Hardin-Lavin Co.**  
417 W. 45th St. CHICAGO

### BONDED GUARANTEE

Our guarantee label appears on every fixture we ship. It is your assurance of a square deal. We will replace, without cost to you, any fixture or part that proves defective or not as represented. We guarantee satisfaction. Everything we sell is grade A. "Highest Quality at Wholesale Price" is our motto.





*It's gettin' old, my easy chair—  
It shorely has seen better days—  
But, like some old time bayhood chum,  
It's sorter learned to know my ways;  
No other chair seems half so soft—  
To hold such welcome arms widespread,  
An' use has hollowed out a place  
Just whar a fellow rests his head.*

*Old things, old friends are ever best—  
A pipe that's reached its seasoned prime—  
Tobacco that has mellowed out  
Beneath the golden touch of time.*

*I hope, Friend Reader, that you, too,  
Have three such trusty pals some-  
where—*

*Age-mellowed Velvet, close  
to hand,*

*A seasoned pipe, an  
easy chair,*

*Velvet Joe*



10c Tins

5c Metal-lined Bags

One Pound Glass Humidors

With New Ash Tray Top

***The International Jury of the Panama-Pacific Exposition awarded the GRAND PRIX to VELVET: for its superior quality—the highest award ever given to any pipe tobacco by any International Exposition.***

*Liggett & Myers Tobacco Co.*

W. F. HALL PRINTING COMPANY, CHICAGO





WILLIAM L. LONG, President  
W. M. WATSON, Vice President  
J. L. WATSON, Secretary

# PIONEER LIFE INSURANCE CO

NEW YORK CITY, N.Y.

*Refer to Mr. Colgate*

Sept 11<sup>th</sup> 1916

Colgate New York

Gentlemen - Increase the enjoyment of shaving? It can't be done when one uses Colgate Shaving Cream, you are attempting the impossible when you advocate it.

You are attempting to build up the sale of your Tale Powder, Lilac Imperial Water and Charmin Cold Cream on a false foundation.

Take your Shaving Cream, a good razor and use plenty of water and you have the acme of shaving enjoyment.

Back up!

Very truly yours  
M. P. Watson.

*It might have been more readily - cannot we had said "Colgate" instead of "increased"*

*Ask him if he has really tried it. Any or all of these methods.*

*Go right along - on high gear*

*He evidently dreams Shaving Comfort insurance as well as life insurance. No dream after a Colgate Shave*

**Increase Your Enjoyment of Shaving**  
Colgate's Tale Powder  
After shaving - wash the face and dry thoroughly. Sprinkle the Tale Powder on the moist face on the palm of the hand and rub over the face.  
Colgate's Lilac Imperial Water  
After shaving - wash the face with a few drops of Lilac Imperial in the palm of the hand and rub the face gently with dry.  
Colgate's Charmin Cold Cream  
After shaving - wash the face and dry thoroughly. With the palm of the hand apply a thin film of Charmin Cold Cream to the face. Wipe the face dry (some prefer to dry the face with a towel).

↔ This circular inspired the above letter and our comments. Colgate & Co., Est'd 1806, New York